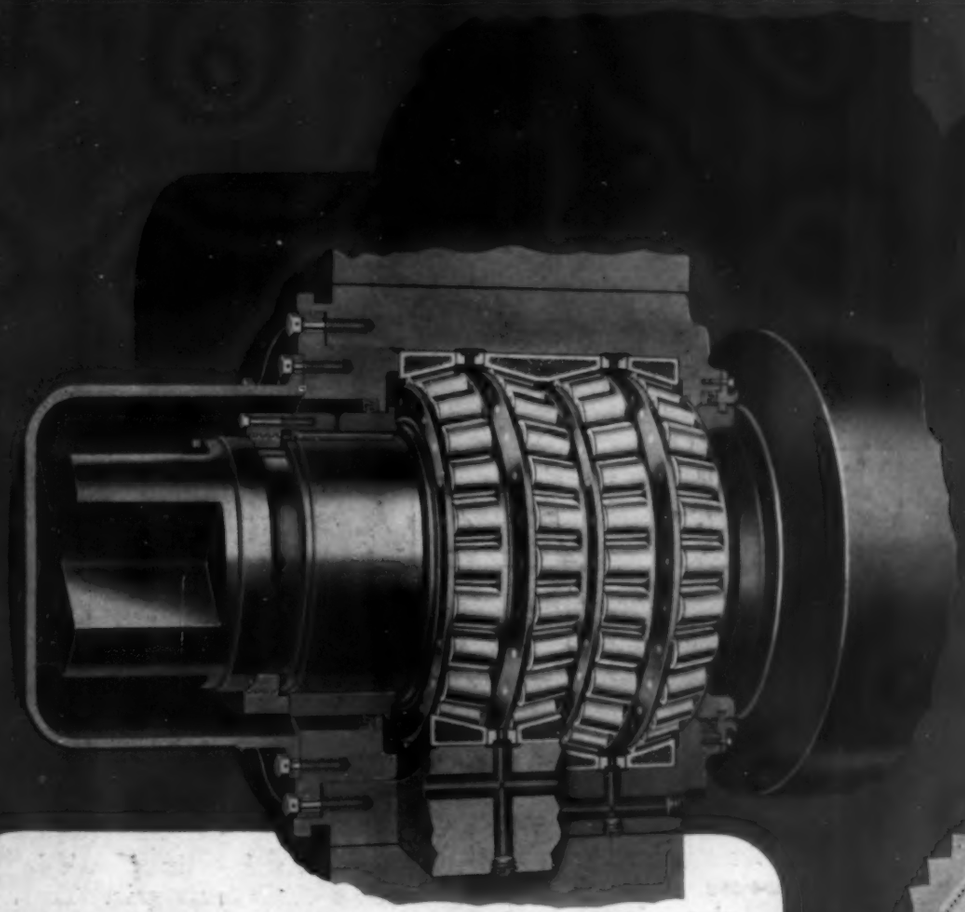
June 8, 1942

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

ESTABLISHED 1882



Latest design of the Timken 4-Row Back-up Roll Neck Bearing as applied to some of the largest and most important rolling mill installations in the steel industry.

The improvements you put into your rolling mill equipment now will pay big dividends after victory—when the world settles down to the serious business of reconstruction and commercial competition is resumed.

Timken Tapered Roller Bearings remove all speed restrictions as far as roll neck bearings are concerned. Rolling speeds in excess of 2,000 feet per minute are regularly accomplished. Involuntary stoppages for bearing replacement are unknown. Roll separating forces running into millions of pounds are handled with ease. Bearing life is measured in millions of tons.

Timken Roll Neck Bearings made the high speed strip mill possible and their records of performance and economy have yet to be matched. Roll to post-war prosperity on Timken Bearings.

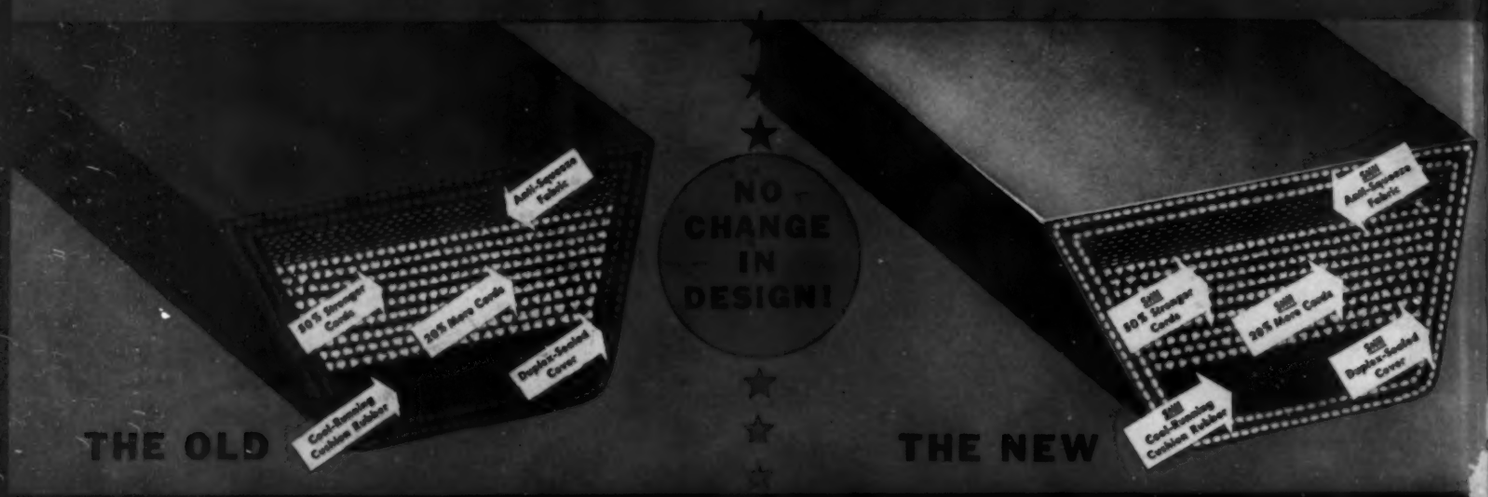
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Keeping 'em rolling faster brings Victory closer. Redesign your steel mills for higher production, lower costs. Put Timken Bearings on all roll necks.

TIMKEN

TAPERED ROLLER BEARINGS

Announcing A New Uniform for the famous Red Belt



TEXROPE Goes to a war-time black!

YOU STILL GET . . .

1. The 50% stronger cords made possible by the sensational new Flexon process.
2. The 20% more cords that help give Texrope Super-7 V-Belts their extra "muscle".
3. The increased life provided by Texrope's shock-absorbing, cool-running rubber cushion.
4. The extra protection against grit, grease and dampness of the duplex-sealed cover. The *only* thing changed in cover design is the color!

WHAT: It's a change in Texrope* Super-7 V-Belt *color* . . . from its well-known red to a war-time black. The *only* change in design is in color — and the color change is only skin-deep.

WHY: To free additional stores of red-pigmented rubber for meeting America's special and growing war-time needs, Allis-Chalmers gladly surrenders — on its own initiative — the red surface pigmentation of Texrope V-Belts.

WHEN: Texrope V-Belts are being produced in black *now* . . . and with stocks of red belts on hand you are assured of no curtailment in supply or in the range and number of sizes available.

Texrope's loss in identifying color is Uncle Sam's gain. That's right and proper. And *your* loss is zero. *Every last one of the famous Texrope design features remains the SAME!*

Today, when your production depends on your V-Belt equipment, get *all* the advice and help that's yours for the asking at your Texrope dealer or nearby Allis-Chalmers district office. Or write Allis-Chalmers, Milwaukee, Wis.

*Trade mark registered U. S. Patent Office. Texrope Super-7 Belts are the result of the co-operative research and design genius of *two* great companies — Allis-Chalmers and B. F. Goodrich — and are sold exclusively by Allis-Chalmers. A 1516

Available in all sizes 1/2 hp to 2,000 hp

ALLIS-CHALMERS
MILWAUKEE · WISCONSIN

WE WORK FOR VICTORY — WE PLAN FOR PEACE

Mayari R steel that would ordinarily have been used to make box cars, trucks, buses—or even coal-grab buckets—is now being devoted to the making of planes, tanks and guns.

The need for fighting equipment of all kinds needs no emphasis, and Mayari R has been applied to hundreds of parts, particularly in mobile equipment where its weight-saving is so great an advantage.

When peace comes again, this high-tensile, low-alloy steel will be even better and more useful, as continuous research and new applications are leading to improvements and refinements. Mayari R then will help you to make your products stronger, lighter, more efficient, better able to meet the challenge of competition.

Physical properties of Mayari R:

Ultimate tensile strength, p.s.i., minimum	70,000
Yield Point, p.s.i., minimum	50,000
Elongation in 2 in. per cent minimum	22
Endurance limit, p.s.i.	50,000
Endurance ratio	0.70
Modulus of elasticity	28-30,000,000

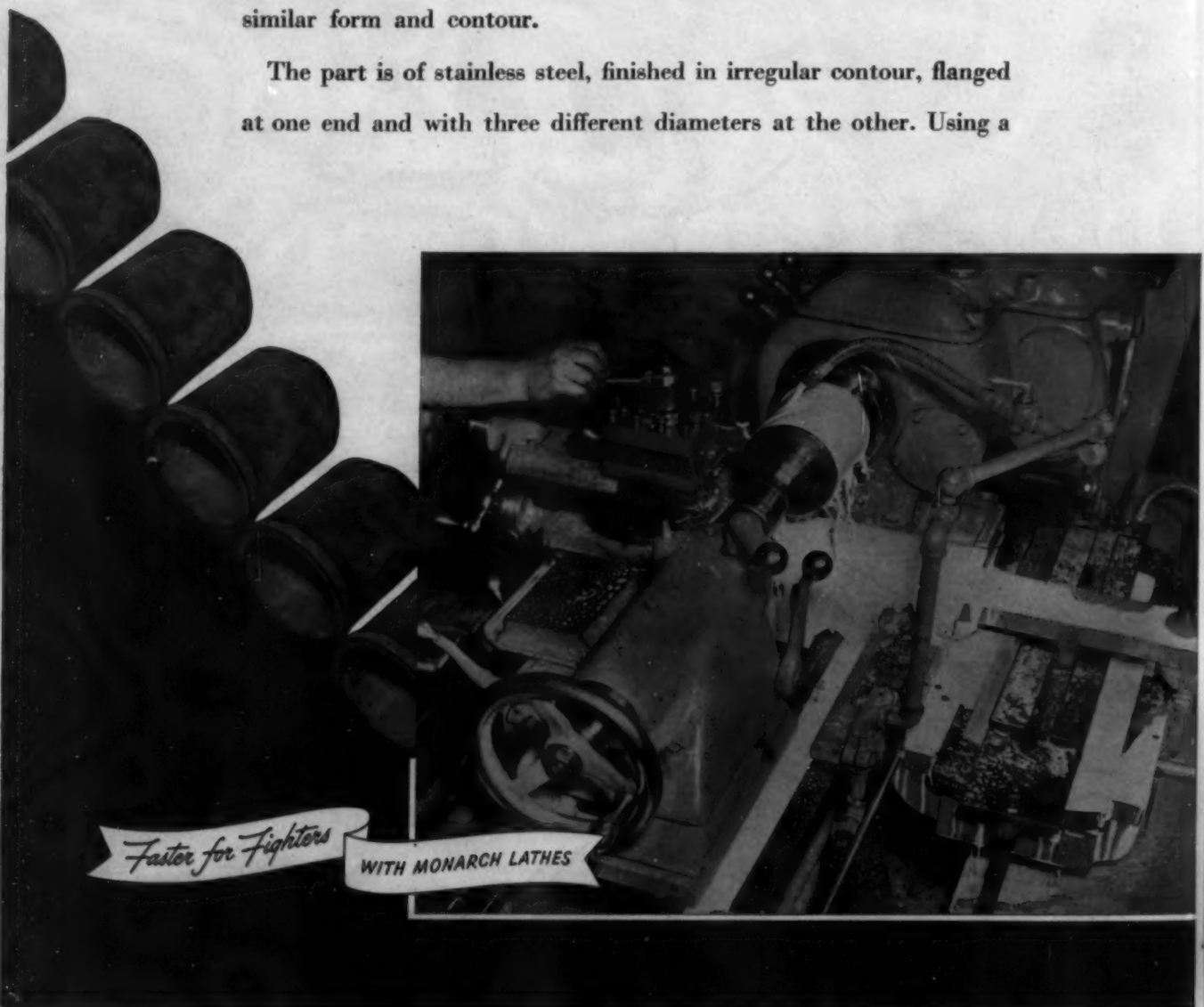
BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

Keep 'em rolling faster

The method used by this producer of war equipment to finish a starter cylinder may be helpful to other manufacturers faced with the necessity for faster and more accurate production of parts of similar form and contour.

The part is of stainless steel, finished in irregular contour, flanged at one end and with three different diameters at the other. Using a



WITH MONARCH FORMING ATTACHMENT

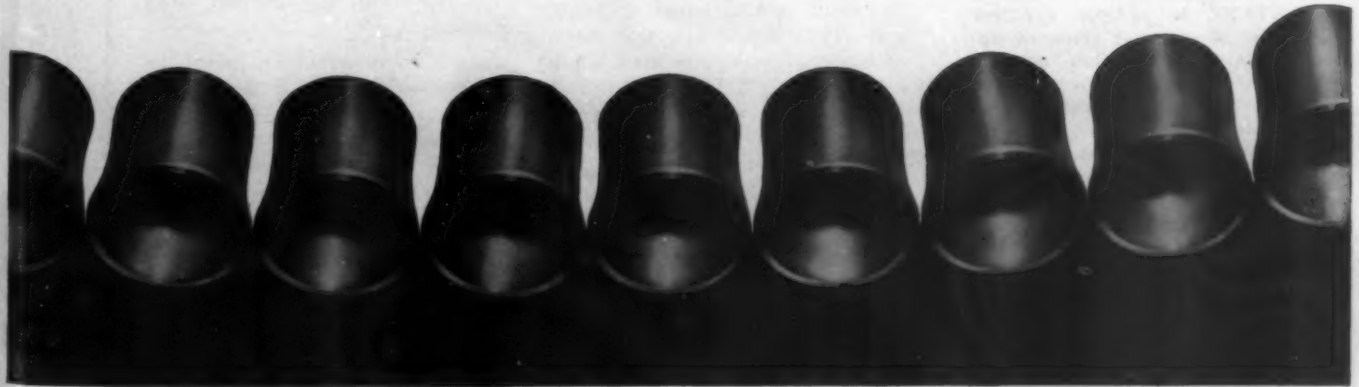
Monarch Lathe equipped with mechanical profile or forming attachment, the job is finish-turned completely in one setup. A double track cam guides the roller follower and reproduces the form on the work. Accuracy of form, providing perfect interchangeability of cylinders, is a basic requirement. This is being accomplished on a production basis with this Monarch equipment.

In war plants throughout the country, Monarch Lathes are producing with speed and accuracy literally millions of parts for our Victory program . . . are helping to deliver planes and tanks and ships and guns . . . *faster for fighters.*

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

MONARCH LATHES

COVER THE TURNING FIELD



Behind the Scenes with STEEL

V-Mail

■ The officers of the Army tell us that, next to good food, letters are the most powerful morale builder in Uncle Sam's armed forces. It's so important that the government has arranged to transfer letters to microfilm and fly them to soldiers and sailors not possible to reach with formerly shipped mail. They call it V-Mail.

Today, while you're thinking about it, why not take off a few minutes and say hello to one of the boys from your plant or office. He'll appreciate it, we guarantee.

New Priorities Guide

■ As things now stand, STEEL's new Priorities Guide, completely revised and up-to-date, will be published as a separate section accompanying the July 6 issue. As before, extra copies will be available for all regular readers free of charge in small quantities and at the nominal charge of 10c each for anything over a dozen copies. If you would like to reserve a supply in advance and thereby help in determining the press run, it will be greatly appreciated.

Incidentally, STEEL's regular Priorities section each week has provoked a very healthy stack of complimentary letters. For example here is what H. N. Robinson, H. N. Robinson & Co., Evansville, Ind., had to say in this morning's mail:

We should like to say that the section on Priorities in STEEL is of the greatest help to us as it gives us up-to-date information on the latest orders and regulations that we are not able to get elsewhere.

Every Day Evidence

■ We have looked over dozens of "readership" surveys, argued the pros and cons of "readership" questionnaires, and even though STEEL always shows up well in any of them, the real proof and satisfaction of how STEEL is *used* is in each morning's mail with the steady flow of letters which begin:

In a recent issue of STEEL (May 25, page 54) we find an item of exceeding interest to us. Is it possible to obtain about 25 tear sheets of the article?

Next Week

■ Next week STEEL's outstanding series of articles on Forgings continues with Resistance Heating For Forging by Professor Arthur F. Macconochie. This entire series will be, upon completion, reprinted into a convenient handbook as a complete text on forgings.

Coming Soon

■ And coming up in the next few weeks, more HOW articles to help production:

How to minimize the cost and time in surfacing steel.

How air conditioning licked a pouring problem.

How to determine tapping temperatures by spoon tests.

How hydraulic braking of cranes saves wear and tear.

NE Steels

■ The livest subject in the steel and metalworking industries at this time is the new NE (National Emergency) steels. This week in STEEL you will find the story, and the first charts on test results. Others will follow in coming issues of STEEL and if you should like tear sheets or reprints they will be made available.

This work, which involves the free exchange of information on the part of all interests involved, and a complete elimination of the "trade secrets" of ordinary times, is under the sponsorship of the War Production Board, with the American Iron and Steel Institute distributing the information as it is accumulated.

Random Notes

■ Hot off the OEM, Division of Information griddle are the following facts and figures: The 8000 tons of steel which used to go into novelties and souvenirs would make 160,000 .50 caliber machine guns.

Fountain pens and automatic pencils used up 2800 tons of steel last year, enough for 430,000 shells for 75 mm field guns.

The glycerine produced as a by-product in making ten pounds of soap is the amount required for manufacturing six pounds of dynamite.

Ten thousand tons (*they say*) of steel went into the metal tops of the 1,000,000 jars manufactured last year to hold cold cream and other cosmetic products. *Pretty heavy tops.*

When a tanker loaded with gasoline is sunk by an Axis submarine enough gas is lost to have driven 5000 autos for a whole year at the normal rate.

Lipstick containers, rouge boxes and miscellaneous brass bottle caps used up 2800 tons of brass in 1941, or 2250 tons of copper and 550 tons of zinc.

The 70,628 tons of lead which were used last year in autos, golf clubs, toys and refrigerators figures out at about four pounds for each of 35 million American families. This four pounds of lead would provide all the lead needed in making five big shells for 240 mm howitzers.

And from our own office of fascinating figures: If all of your fellow readers of this week's issue of STEEL (including yourself) each went to your nearest post office today and bought a $5.00 war savings stamp, it would add one fully equipped flying fortress to Uncle Sam's air force which is getting warmed up for action, and we don't mean maybe.

Vol. 110, No. 23, June 8, 1942, issue of STEEL, published every Monday at Cleveland, O. Entered as second class matter at the postoffice, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00

Buy a War Bond—Today!

YOUR REFRACTORIES SERVICE MAN ...THE BASIC FIELD ENGINEER

As steel furnaces continue to operate at or near capacity, refractories are subjected to greater strain and faster wear. Thus good refractories, properly applied, are increasingly important to the steady, efficient production of open hearth and electric furnace steel.

To the men who operate the furnaces—men successful in meeting production problems with ability and judgment—we offer the assistance of a staff of trained engineers, capable men to service good refractories.

Basic Field Engineers are, first of all, experienced steel men. From years of work with the open hearth they know the practical side of steel making. They also know refractories. Their specialized training and knowledge enable them to tell how refractories will act under variable conditions.

You, as a busy open hearth or electric furnace operator, can confidently rely on the Basic Engineer as your refractories service man. His job is to supervise and assist with the installation of new hearths, major repairs and special applications. In fact, there may be numerous situations on which he may be able to advise you so as to reduce delay time and lower refractory costs.

Call upon this Basic Engineer whenever you have a refractory job to do. He is anxious to help you get maximum production out of your furnaces.

MAGNEFER—Dead-burned dolomite for hearth and slag line maintenance.

SYNDOLAG—Dead-burned, rice size dolomite for maintenance.

BASIFRIT—Quick-setting magnesia refractory for new construction, resurfacing and maintenance.

OHIO MAGNESITE—Domestic dead-burned high-magnesia grain refractory, equal to Austrian.

695 PLASTIC—Strong plastic basic refractory for hot and cold repairs.

RAMIX—An air-setting, time-saving basic refractory for rammed hearths and cold repairs in open hearth and electric furnaces.

GUNMIX—A basic refractory with chemical bond, sized for use with a cement gun.

HEARTH PATCH—For deep hole patching and other quick repairs in the basic open hearth.

RAW DOLOMITE—Washed open hearth dolomite in rice size and standard ¼-inch.

BASIC REFRACTORIES INCORPORATED

FORMERLY BASIC DOLOMITE, INC.

CLEVELAND, OHIO

• • • — for Victory • • • —

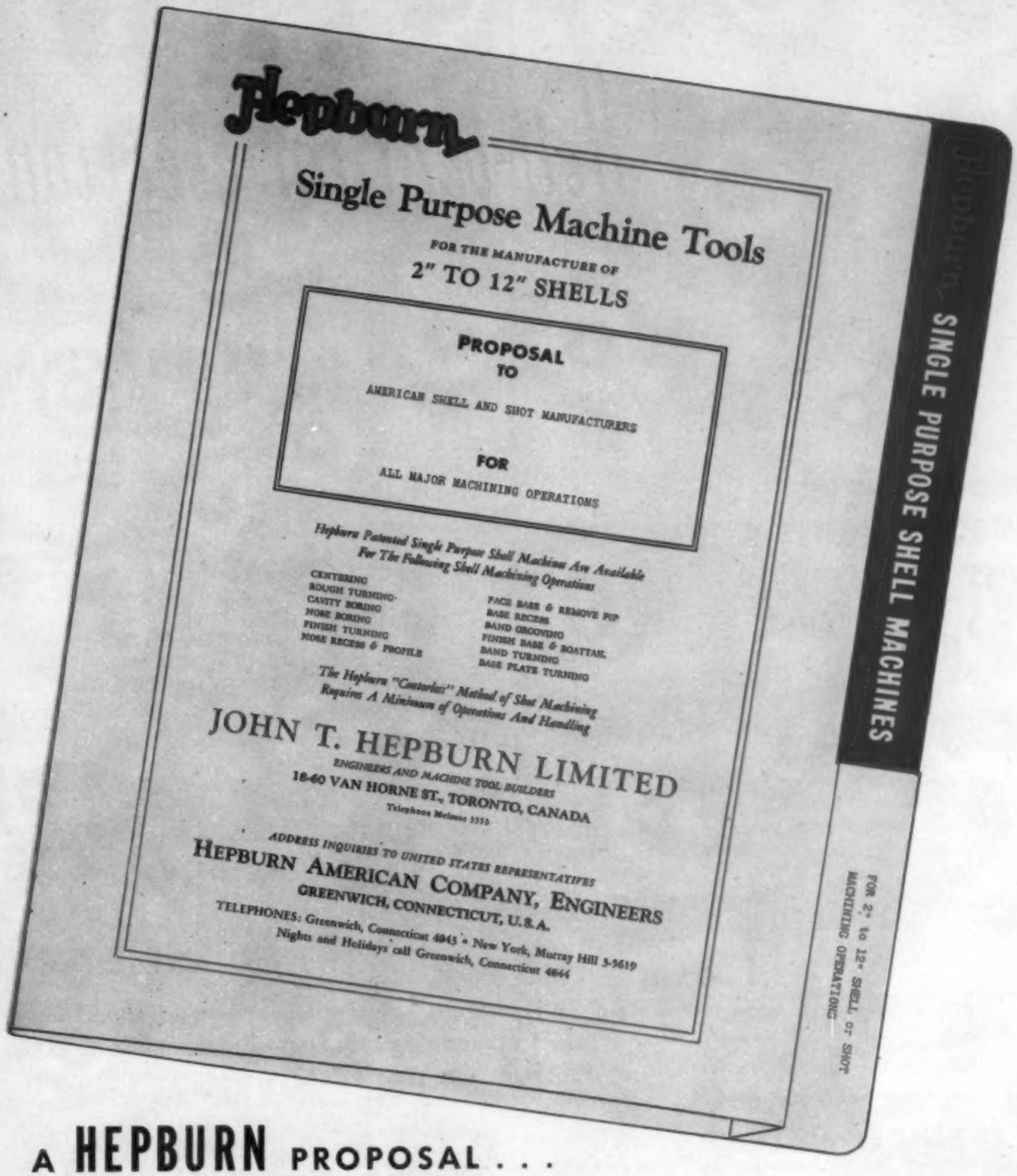
THE CLEVELAND CAP SCREW CO., 2917 EAST 79th STREET, CLEVELAND, OHIO

BY THE BOX, OR BY THE MILLION . . . BUY

CLEVELAND CAP SCREWS

SET SCREWS • BOLTS AND NUTS

Address the Factory or our Nearest Warehouse: Chicago, 726 W. Washington Blvd. • Philadelphia, 12th & Olive Streets
New York, 47 Murray Street • Los Angeles, 1015 E. 16th Street



A HEPBURN PROPOSAL . . .

places before you the complete machine tool specifications for the major machining operations on the specific shell or shot you are considering.

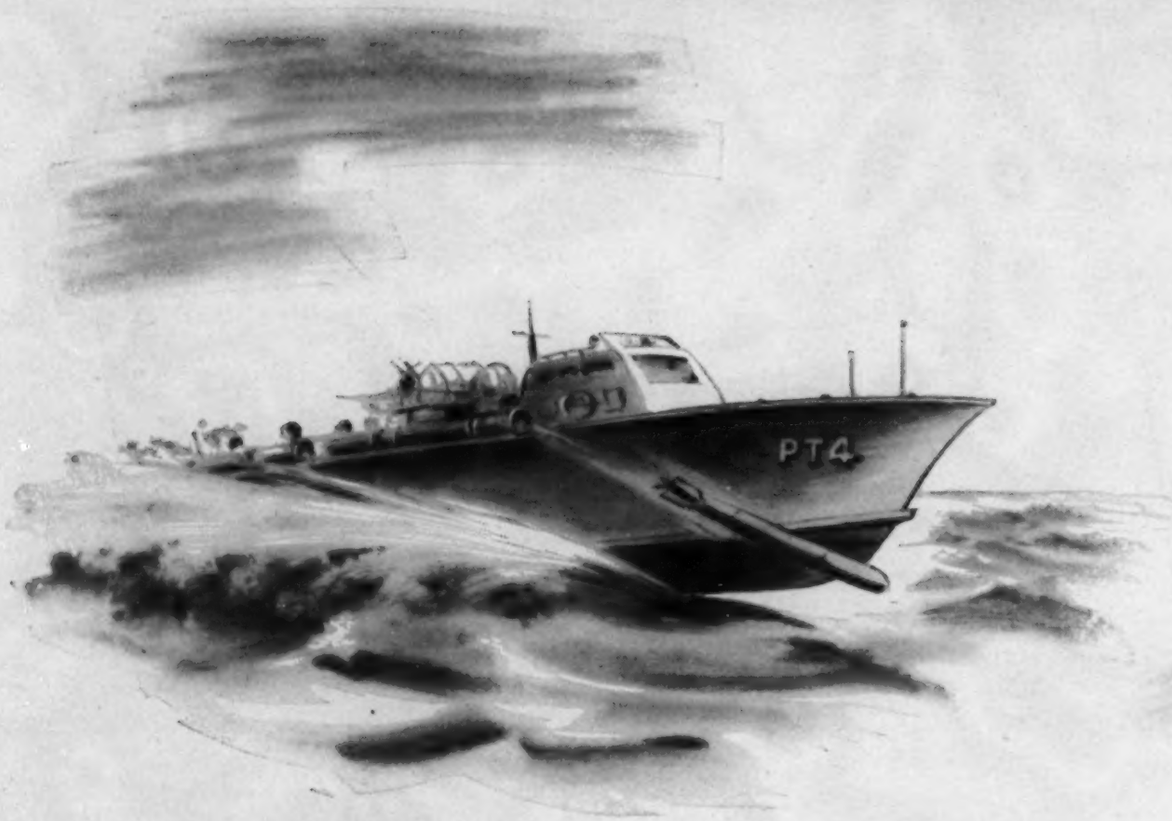
The Hepburn line includes a series of 32 basic single purpose machine tools engineered for machining each size and type of shell and shot within the size range of from 2" to 12" and equivalent metric sizes.

Hepburn Proposals are available on request only to manufacturers of shell and shot or to companies negotiating for such manufacture.

To conserve time, requests should advise the size and type of shell or shot and the production requirements per hour. They should be addressed to United States Representatives, Hepburn American Company, Greenwich, Connecticut.

Reasonable Deliveries Are Available

Hell-bent-for-election



THESE flying water-scats were designed almost beyond the power of men to control. As it is, the men must be heavily padded, lashed to their positions, to take the pounding of terrific speeds in rough weather.

Every part of these mosquito boats from gun to galley has been specified and manufactured to withstand the hard use that make the boats a powerful weapon of attack.

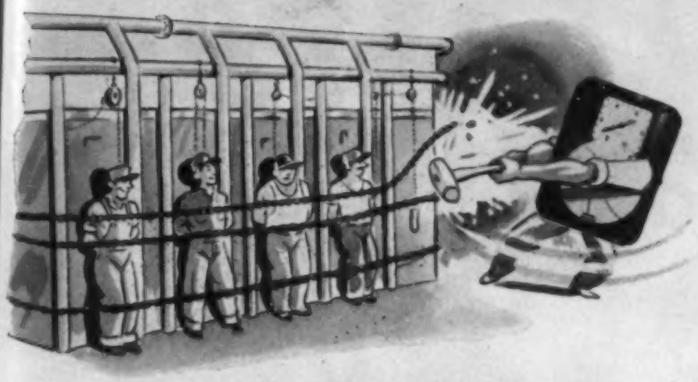
For rugged service in the heavy duty machines of war—and for delicate duty in the sensitive instruments of science go Barnes-made springs in endless streams from mass production lines, controlled by the engineering skill of veteran springmakers.

Wallace Barnes Company

DIVISION OF ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT, U. S. A.

PYROMASTERS ON OIL-FIRED FURNACES FREE 4 FIREMEN



RAISE OUTPUT 10%

. On 9 oil-fired furnaces, Bristol's Pyromaster Time-Temperature Controllers plus recording pyrometers

— freed four firemen for more important duties

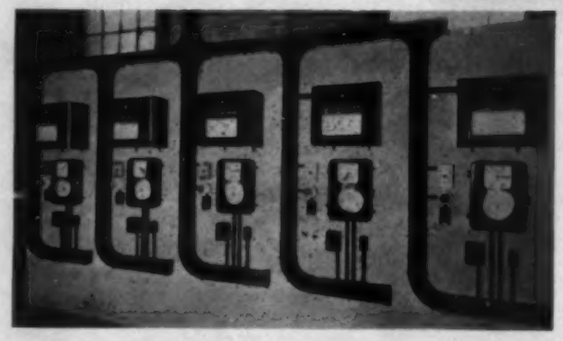
— increased furnace output 10%

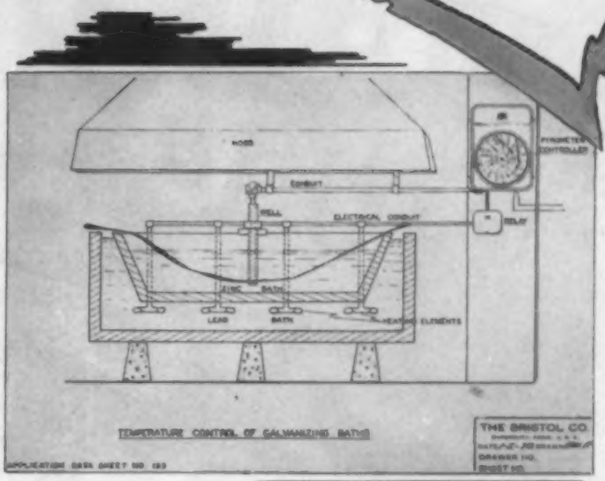
— greatly improved uniformity of the product.

Safety controls automatically close oil line when temperature of any thermocouple surpasses limit of 1800° F. Time-Temperature Pyromasters automatically raise temperature at a definite rate to the desired point — hold it for an exactly determined time — lower it according to a fixed time schedule in the process of annealing malleable iron castings.

Full details of this interesting control system, plus a copy of Pyromaster Bulletin 507 available on request to 112 Bristol Rd., Waterbury, Connecticut.

BRISTOL'S





GALVANIZE WITHOUT BURNING ZINC . . . OR COATING TOO THICK OR THIN

With precise, automatic temperature control of the galvanizing bath, there's no more worry about excessive temperatures burning the zinc and laying too thin a coat on the iron — nor of laying on too *thick* a coat, due to excessively *low* temperatures.

Either Bristol's Pyromaster (when records are desired) or Indicating Controller Model 478 give ideal precision control plus ruggedness to withstand operating conditions in galvanizing rooms.

BRISTOL'S

Write for Bulletin 488 on Millivoltmeter Pyrometers.

FORGING REJECTS CUT TO VANISHING POINT

In a medium-sized machine building plant, the long-experienced forging furnace operator used to gauge furnace temperatures by sight. He was as accurate as a human gauge could be, but still rejects piled up. Today, with a Bristol's Wide-Strip Potentiometer Recording Controller, straight line temperature is automatically maintained and recorded at all times, rejects have dwindled almost to nothing, and the blacksmith shop foreman can spend his time more valuably than in constant manipulation of manual controls.

Write for full details on this installation, and for Catalog 1452, on Wide-Strip Pyrometer.

BRISTOL'S

BRISTOL

... Gives YOU the Most from Heat

THE BRISTOL COMPANY

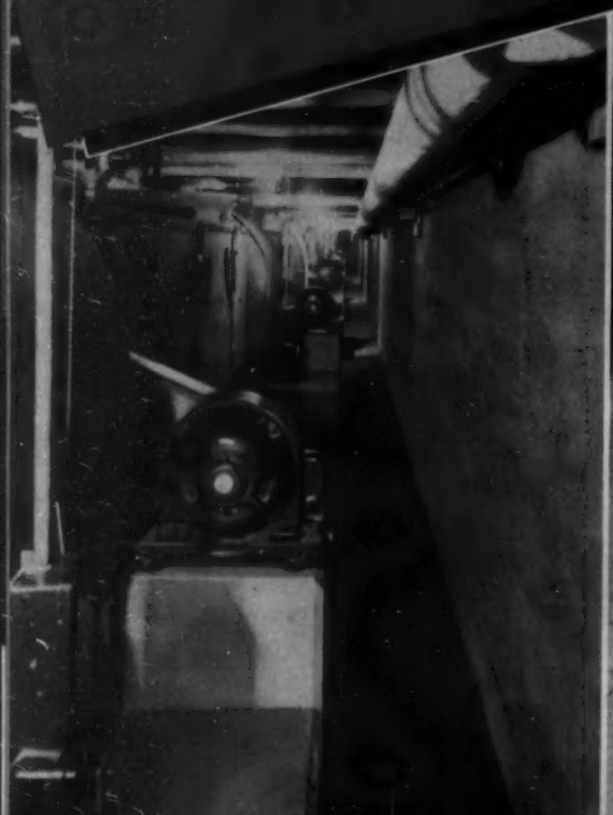
WATERBURY, CONNECTICUT

THE BRISTOL CO. OF CANADA, LTD.
Toronto, Ontario

BRISTOL'S INSTRUMENT CO., LTD.
London, N.W. 10, England

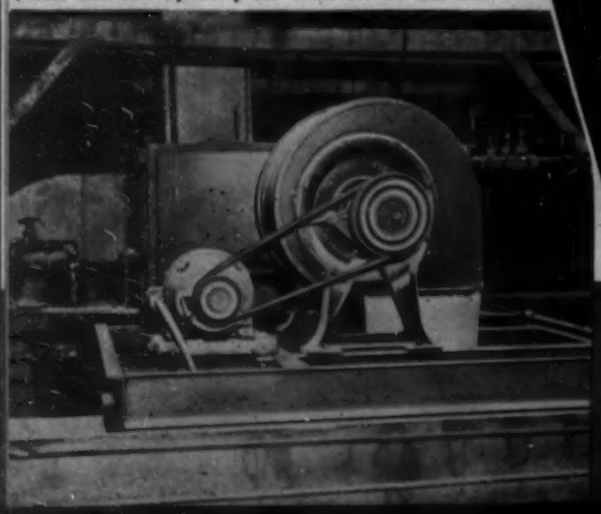
AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

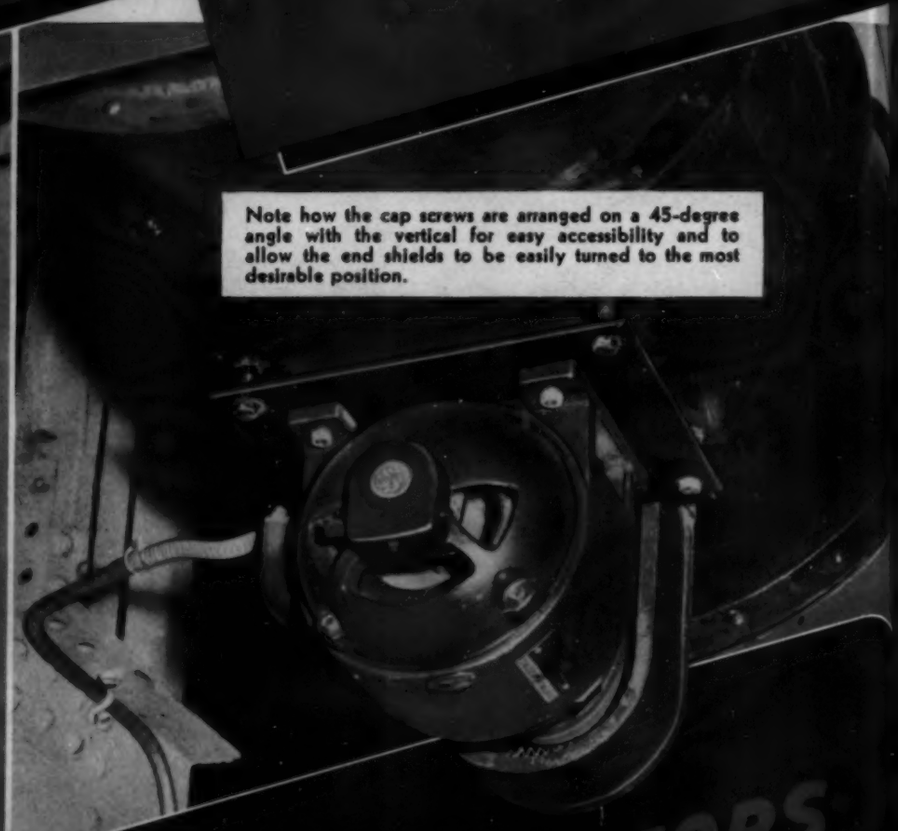
YOU TOO CAN SAVE TIME.



↑ Here are Tri-Clad motors driving fans on continuous dryers in a wood-plant. A double-end ventilation system, plus Formex wire—highly resistant to heat shock—make Tri-Clad an excellent choice for such hot jobs.

Settling dust gets nowhere with this Tri-Clad motor—driving a blower. Its sleeve-bearings are sealed against ↓ dust and dirt by complete enclosure in cast iron.





Note how the cap screws are arranged on a 45-degree angle with the vertical for easy accessibility and to allow the end shields to be easily turned to the most desirable position.

SPECIFY

TRI CLAD MOTORS

THEY GIVE

1. *Extra Protection* AGAINST PHYSICAL DAMAGE
2. *Extra Protection* AGAINST ELECTRICAL BREAKDOW
3. *Extra Protection* AGAINST OPERATING WEAR

Tri-Clad motors are now available up to 100 hp in standard, open construction, and in a wide range of other types and ratings. Ask your G-E representative for complete details, or write General Electric, Schenectady, N.Y.

BUILT FOR PROTECTION FIRST . . . TO LAST!

TROUBLE

. . . by using

TRI-CLAD MOTORS

REG. U.S. PAT. OFF.

on your FANS and BLOWERS

MANY fans and blowers must be installed high above the factory floor, or in awkward locations where working space is limited. Here's where the Tri-Clad motor becomes a real time-saving aid to hard-pressed installation crews hurrying to get vital equipment into production.

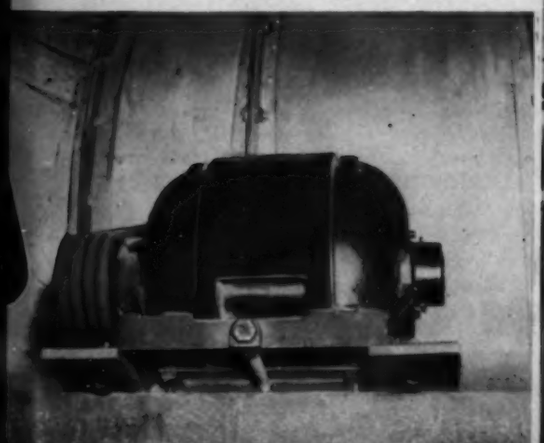
Tri-Clad motors are a cinch to install because of their light weight and compactness. Also, their shape facilitates ease of handling, by hand or with slings. Four-position end shields permit flexibility in mounting, and the roomy, four-position conduit box affords unrestricted working space. All leads are permanently identified. In addition, Tri-Clad features facilitate lubrication and other routine maintenance.

Specify Tri-Clad motors on your next order. You, too, will find that they save precious man-hours when you're installing equipment essential to the war program.

↑ Here again, light weight and convenience in mounting and lubrication are important advantages of this Tri-Clad motor driving an exhaust fan.

When motors must be located where attention will be infrequent, such as these up near the ceiling, the extra-protection features of Tri-Clad motors become especially valuable. ↓

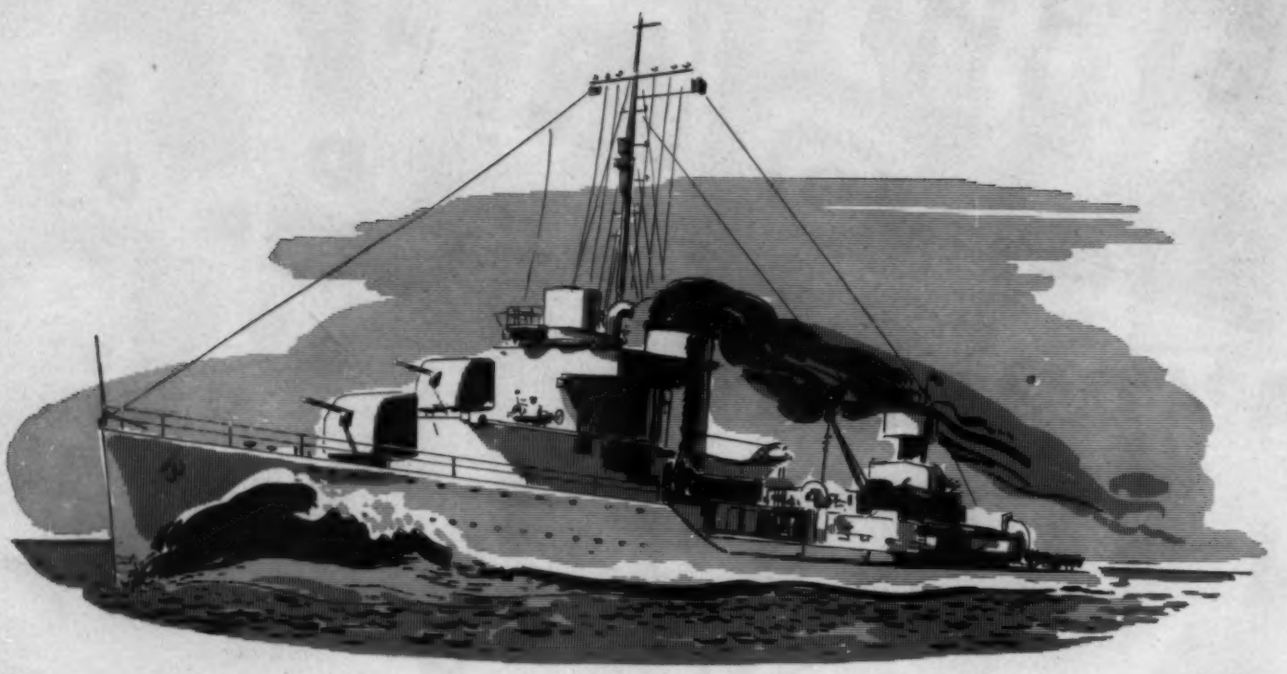
↓ Installed close to a duct, this Tri-Clad motor illustrates the importance of convenient wiring features. An improved pressure-relief system of lubrication is advantageous when motors are located in such positions.



GENERAL ELECTRIC

750-124-8018

you asked for speed—



— and here it is! There is no "waiting your turn" at the Hanlon-Gregory galvanizing plant. We have capacity to spare. Materials are placed in process as fast as received and re-shipped without delay. Speed has been accomplished without any sacrifice of thoroughness, by eliminating every possible minute of idle time before and after processing. Plates, shapes and fabricated jobs are moving through on a one- to two-day schedule. Contractors are enabled to meet delivery dates and ships are launched on time. If you are in a hurry, ship your defense work to us. We can re-ship a galvanized or pickled and painted job the day received, if necessary. Our plant is conveniently located, too—within short-haul distance of over half the defense plants in America.

THE WORLD'S LARGEST JOB GALVANIZING PLANT

Hanlon-Gregory

GALVANIZING CO. PITTSBURGH, PA.

WHEN YOU CHANGE FROM STEEL TO

Wood Construction

*U. S. Patent No. 2056088

● "Horse & buggy" days are not here again but it is certain that many structures and many kinds of equipment which have been made of steel will have to be made of wood "for the duration." Tanks for the process industries, storage facilities in industry as well as on the farm, can be built substantially of wood. Skids and platforms, roofing members, low buildings, including barracks—all these and many more can be of wood. Variable speed transmission units are made of wood. So are bridge structures. Wood is plentiful, relatively cheap, and is rapidly replacing steel in today's emergency. So when you change from steel to wood construction—you will need the proper kind of bolt to make a strong, weather-resisting, sturdy assembly. And bolts especially designed for wood construction are shown here—one of them of rapidly growing importance. This one is the patented Lamson **Weather-tight* bolt. It is the bolt shown with the tapered, splined shank, and the round, slightly convex head with the concentric ribs beneath the head. This bolt has features shared with no other bolt, viz: it prevents moisture entering the wood from either end of the bolt; makes a tighter assembly; needs no counterboring; will not turn in the hole when tightened; makes a positive factor of "safety-first." Although originally developed for use by railroad car builders, millions of Lamson **Weather-tight* bolts have been used during the past few years by many other industries. Be sure you are familiar with its advantages. Ask for folder describing it.

THE LAMSON & SESSIONS COMPANY • 1971 West 85th Street • Cleveland, Ohio

Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

LAMSON & SESSIONS

BOLTS · · NUTS · · COTTERS · · CAP SCREWS · · SPECIALS

Your Jobber Stocks the Lamson Line

Keep those boilers going!
● A year ago it was bad enough when a boiler had to be shut down for repairs to the setting. But today a delay that upsets your production schedule is a downright tragedy. It's not only costly to you, but serious to customers who depend upon you for badly needed supplies.
The installation of "Carbofrax" along the clinker line on side walls and in front and bridge walls is one sure way of providing for continuity of operation. Besides eliminating frequent and untimely outages, due to lining failures, the use of "Carbofrax" brick insures maximum steam production because clinker does not build out on them. With the full effective grate area thus maintained, combustion conditions are vastly improved and greater efficiency results.
"Carbofrax" brings you these benefits because of its extremely high refractoriness—outstanding resistance to spalling, cracking and clinker adhesion.
Regardless of the purpose for which you develop steam and whether it be in the steel mill, forge shop, process industries, etc., continuous boiler operation is especially important during these turbulent days. Why not call on our representative to explain in more detail how "Carbofrax" will help you attain uninterrupted service and at the same time lower your refractory and maintenance costs.
CARBORUNDUM
Refractory Division
THE CARBORUNDUM COMPANY
REG. U. S. PAT. OFF.
PERTH AMBOY, N. J.
District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh.
Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Fire Brick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fireclay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.
Carborundum and Carbofrax are registered trade-marks of and indicate manufacture by The Carborundum Company.

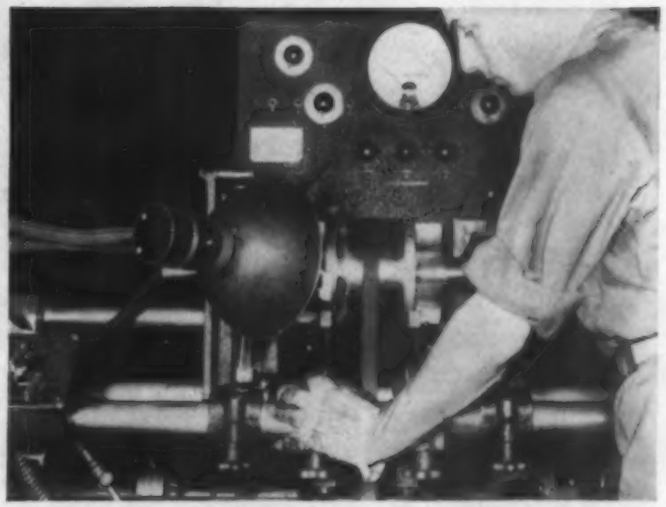
Unbalanced!...ME?

FORGIVE US, Rover, for making an example of you! But your joyous moments, when the tail wags the dog, remind us of the way that one unbalanced part can shake—and punish—a whole motor assembly.

Take, for example, a 40-lb. electric motor. At only 200 r.p.m., one ounce inch of unbalance in the armature may not seem so important. But now step the speed up to 5000 r.p.m. and that unbalanced force becomes *44.3 lbs.*—more than the weight of the motor itself. It's enough to shake the motor off its base 5000 times a minute. And there's nothing so joyous about that!

These destructive, unbalanced forces which overload bearings, cause vibration, excessive wear, and noise, are now easily found and corrected through the use of Gisholt Dynetric Balancing Machines. The operation is simple and takes only a matter of seconds. These machines are so accurate they can measure unbalance vibrations down to .000025".

Write for literature.



● *Using the radio means of amplification, this sensitive machine picks up static and dynamic unbalance vibrations and magnifies them as much as 1,600,000 times. It makes proper balance easier, quicker, and more economical to attain than ever before.*

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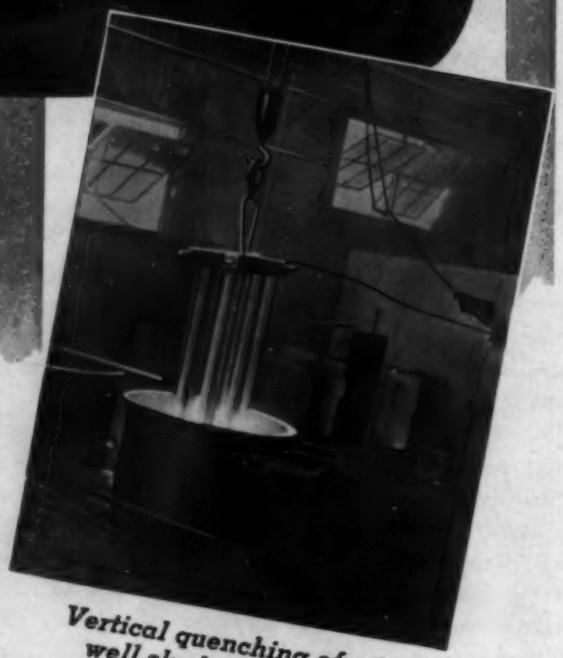
An example of the adaptability of the Hevi Duty Carburizer is the use of a fixture for suspending long parts to avoid distortion during carburizing and subsequent vertical quenching. The adaptability of this type of furnace is also shown in its additional wide use in nitriding — dry cyaniding — bright annealing — and clean hardening.

Send for Bulletin HD-142



Vertical quenching of oil well slush pump rods

HEVI DUTY ELECTRIC COMPANY

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How Medium-Carbon Ferromanganese Helps to Speed the Production of Steel

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ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.

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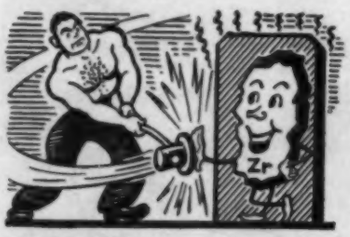

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ferro-alloys and metals, their use, and the service that goes with their purchase, write for this 24-page booklet entitled "Electromet Products and Service."

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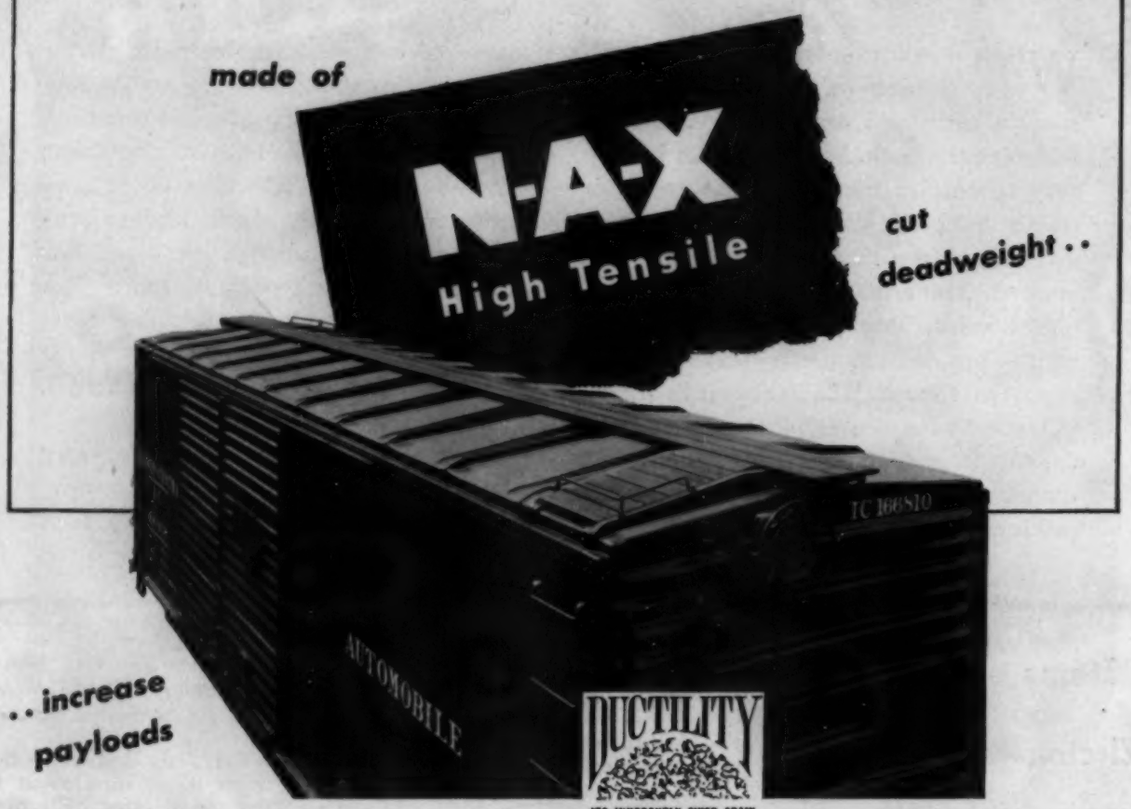
RAILROAD CARS—
FREIGHT AND PASSENGER



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ITS INHERENTLY FINER GRAIN MAKES ALL THE DIFFERENCE
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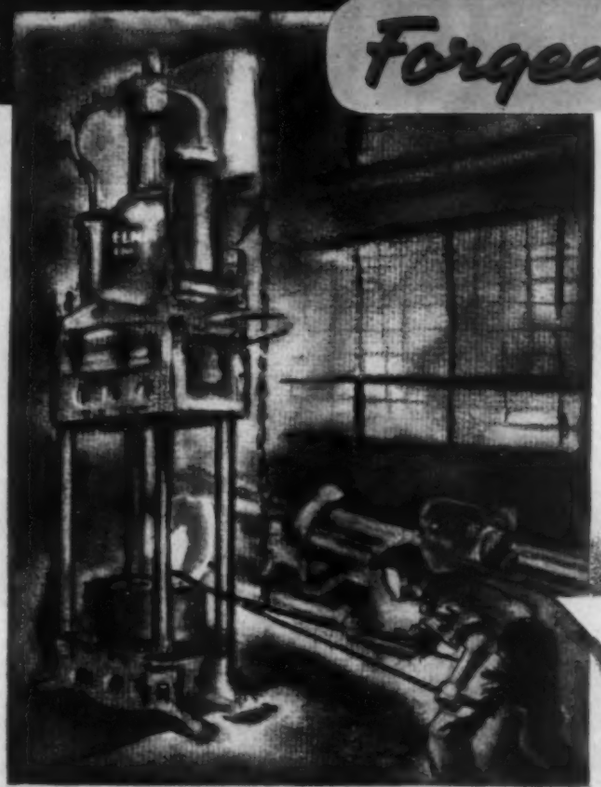

Victory shells, large and small, are being forged and nosed on hydraulic presses built by Elmes . . . Moreover, Elmes presses are turning out parts for guns, ships, planes, tanks and other war equipment. The Elmes line of hydraulic machinery and equipment is complete . . . including forging presses, forming and drawing presses, plastic molding presses, straightening and bending machines, accumulators, pumps, valves and accessories. Since 1851 this organization has been gaining experience in the design and manufacture of precision equipment . . . which experience today is available to users of hydraulic installations.

CHARLES F. ELMES ENGINEERING WORKS
243 N. Morgan Street • Since 1851 • Chicago, Illinois
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METAL WORKING PRESSES • PLASTIC MOLDING PRESSES • PUMPS
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Keeps Bearings Rolling 168 Hours a Week

NO
Compound Loads,
NO Complicated Stresses.
They Give Maximum Capacity in Minimum Space.

ABOVE —
TYPE MCS
Double Width Radial With Separable Outer Race.

RIGHT — TYPE DAT
Thrust Bearing Double Acting, Aligning.

Simple, right-angled loads carried on rollers of uniform cross-section . . . with no compound loads, no oblique loads to complicate the stresses . . . that's why Rollway's Solid Cylindrical Roller Bearings are tailor-made for the war-time 168-hour week.

All loads are uniformly distributed. All races are parallel to the roller axis. There's no pinching effect, no wedging of the rollers against the radius of the race. Sliding friction and wear-back of roller ends are held to a minimum.

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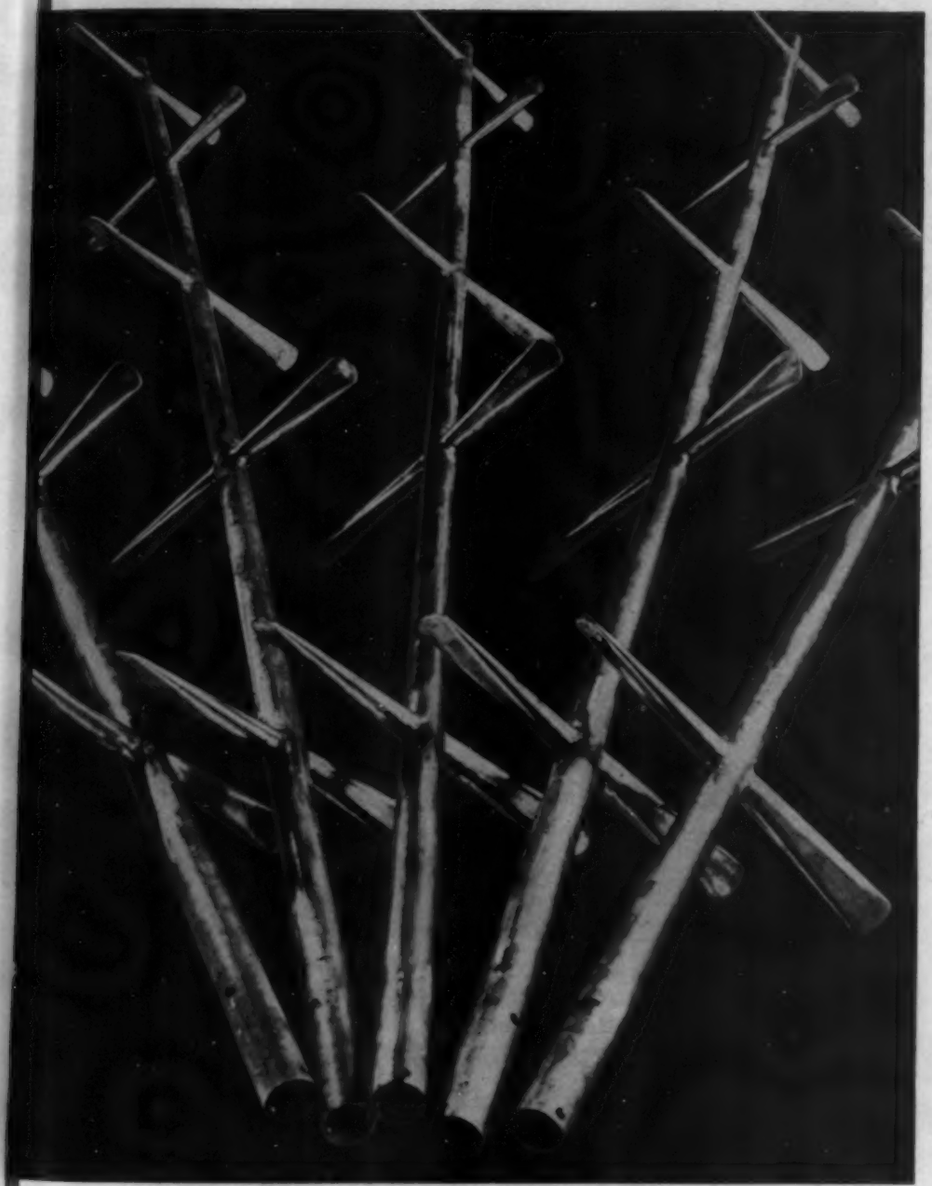
ARE YOU LOOKING FOR Tubular Strength PLUS Corrosion-Resistance?



You'll find both in Republic ELECTRUNITE Stainless Steel Tubing.

ELECTRUNITE provides the high strength-weight ratio of Republic ENDURO* Stainless Steel uniformly throughout every square-inch of the tube. Because it is electric resistance welded, the weld area is as strong as the base metal, itself.

ELECTRUNITE Stainless Steel Tubing possesses, too, all of the resistance to corrosion inherent in ENDURO—with no decrease in corrosion-resistance in the weld area.

For applications in corrosive service—such as the agitator blades at the left—where high strength, light weight and resistance to corrosion are essential to low cost per year of service—where economy resulting from uniformity of fabrication is desired—there's nothing better than Republic ELECTRUNITE Stainless Steel Tubing.

Tell us your application. We'll be glad to offer suggestions for lengthening service life and lowering maintenance cost.

*Reg. U. S. Pat. Off.

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ELECTRIC RESISTANCE WELDED STAINLESS STEEL TUBING

Also Boiler Tubes • • • Condenser and Heat Exchanger Tubes • • • Mechanical Tubing

PRODUCTION STRATEGY PREVENTS A TRAGEDY

Tragic indeed would be our tungsten shortage were it not for the strategic importance of Molybdenum as used to make metal-cutting tools of

MO-MAX

Molybdenum-Tungsten High Speed Steel

Long before the present crisis, thousands of tons of MO-MAX were purchased for quantity and quality production because tools made of MO-MAX, with less than two percent of tungsten and *no increase in vanadium*, proved 20 percent more efficient, on the average, than tools made of 18 percent tungsten steels. Now, with that distinguished service record in widely varying applications, with a reduced supply of tungsten and vanadium, with the need for production greater than ever, the use of MO-MAX is strategic, scientific, economic and patriotic.

For complete technical data write for booklet to any of the mills listed below or to The Cleveland Twist Drill Co., Cleveland, Ohio.

Milling keyways in stern diving-plane shaft—a typical job for MO-MAX steel.

These leading independent steel companies can supply you with standardized MO-MAX under their own trade names:

"LMW"	Allegheny Ludlum Steel Co.	"Molite 8"	Columbia Tool Steel Company	"Tatmo"	Latrobe Electric Steel Co.
"Mohican"	Atlas Steels, Ltd.	"Rex-T-Mo"	Crucible Steel Co. of America	"S.T.M."	Simonds Saw and Steel Co.
"Bethlehem HM"	Bethlehem Steel Company	"Di-Mol"	Henry Disston & Sons, Inc.	"Mo-Tung"	Universal-Cyclops Steel Corp.
"Mo-Cut"	Braeburn Alloy Steel Corp.	"Rex-T-Mo"	Halcomb Steel Co.	"Vul-Mo"	Vulcan Crucible Steel Co.
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2173A

Pipe Bending Presses

for America's Shipyards

MOST BENDS can be made cold on this powerful 200-ton Southwark hydraulic pipe bending press. Time required for heating the pipe is saved and distortion of bend due to cooling shrinkage is eliminated.

Self-contained, this oil operated Southwark hydraulic press is under perfect control of the operator at all times — a feature particularly valuable during difficult bends. Southwark pipe bending presses are time and money savers.

Southwark builds a complete line of shipbuilding machinery including bending rolls, plate planers, keel benders, sectional flanging presses and joggling presses. New designs in these hydraulic presses and power tools are helping shipbuilders do a better job faster. Write for Bulletin K-160 which illustrates many of these products.

Baldwin Southwark Division, The Baldwin Locomotive Works, Philadelphia; Pacific Coast Representative, The Pelton Water Wheel Co., San Francisco, California.

BALDWIN

Southwark

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DIVISION OF THE BALDWIN LOCOMOTIVE WORKS • PHILADELPHIA

Milwaukee Rotary Head Milling Machine

The Milwaukee Rotary Head Milling Machine, primarily developed for tool and die making, is increasingly being used to meet peak production demands on a variety of milling operations. Fast — versatile — flexible — it performs layout, milling, drilling, precision boring and slotting operations with improved accuracy and usually decreases costs.

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MILLING MACHINES

Milwaukee MILLING MACHINES

Standard Machines Do Special Jobs in a Converted "Juke Box" Plant, See p. 30

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Helpful "Staff Work"

IN THE BATTLE OF PRODUCTION

All over America, engineers and production men are converting plants to war needs. These men know they can... upon request... get helpful suggestions from us about ways to speed up the working of metals and alloys.

This helpful information has been mobilized into convenient charts, pamphlets and other printed pieces. These tools-in-type range from technical data for engineers to simplified reports on performance of alloys containing Nickel under specific operating conditions.

Here, also, are correlated latest reports from the field about selection, fabrication and uses of ferrous and non-ferrous Nickel Alloys.

And, as further support for your battle of production, we offer personal assistance from members of our technical staff. With recent experience in many plants facing materials difficulties, these men become especially helpful. During wartime, Nickel... and information about Nickel... must go where it best serves the United Nations.

☆ ☆ *Nickel*

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

HIGHLIGHTING

this issue of STEEL

NEWS Effective use of all our materials for most effective war production is the subject of last week's major news. Chief development was the announcement of a classification system which will enable the War Production Board to trace the flow of materials from primary production to finished products (p. 36). It will supersede a variety of "use" classifications now covered by "M" orders. Its purpose is to provide a basis for more effective allocations of materials. The new system is to apply on all orders placed after June 30. STEEL will publish the details of this system after final revisions have been made.

To conserve materials all new construction has been brought under rigid control (p. 58). Much progress has been made in finding substitutes for scarce metals (p. 34). WPB has issued a revised list of scarce metals (p. 62). Beryllium is under complete allocations (p. 45). The oil refiners have reduced their use of highly alloyed steels (p. 42); sump pumps have been simplified to save copper. WPB has assumed control over many types of instruments and regulators and control valves (p. 43); use of black plate for bottle caps is restricted; coatings containing certain organic binders or pigments no longer may be used on large-sized steel containers. Manufacture of most musical instruments is to be prohibited (p. 44).

Most users of metals will be forced to make use of the Production Requirements Plan to obtain materials during third quarter (p. 44). WPB has formulated a uniform policy for appeals from limitation orders (p. 45). The warehouse reporting form, PD-83, has been revised (p. 40). Refractory brick inventory restrictions have been lifted (p. 42).

Some of the many special problems involved in connection with working under government contracts are presented (p. 76) in the first of a series on this important subject—important because the drafting of your contract may determine your profits or losses.

PRODUCTION Steel production last week continued unchanged at 99 per cent of ingot capacity (p. 37) and pig iron output is advancing as additional stacks go into blast (p. 121).

To insure maintenance of capacity output of iron and steel the iron and steel industry is about to launch an advertising campaign of unprecedented type. Through the American Iron and Steel Institute (p. 37) it will spend between $1,500,000 and $2,000,000 on advertising aimed at stimulating the collection of all sorts of salvageable materials that can be used for war production. Included are iron and steel, nonferrous metals, rubber, tin cans, cooking fats and others.

This week's feature on "conversion" (pp. 30-33) is an eleventh-hour warning to those manufacturers who have not yet converted to war production and desire to do so. For their benefit the story as to how to proceed to get such work is re-told.

TECHNICAL Technical data on the properties of the new NE (National Emergency) steels has begun to accumulate as a result of single-heat test results reported by consumers who have worked with the new materials. STEEL herewith presents graphed information on a number of the new steels; additional graphs will be published in subsequent issues. The American Iron and Steel Institute, at the request of WPB's Iron and Steel Branch, is the vehicle for distributing this information (p. 66).

Dr. C. B. F. Young discusses the problems involved in converting the plating industry to war production (p. 70) and suggests procedure to work out a means of using its production facilities.

Straightening heat-treated parts is a simple and quick job when employing the easily constructed setup described (p. 82) by J. B. Froblom. It is especially suitable for handling work on a production basis.

Cold-worked copper alloys and other nonferrous metals are joined easily (p. 100) at low temperatures without grain growth, loss of hardness or need for reworking, by use of an electric-resistance brazing process.

MARKETS Now that manufacture of so many civilian products is being discontinued so that materials can be used for war production steel mills are receiving fewer orders—but these usually call for larger tonnages for delivery over longer periods (p. 121). Price extras on the new NE steels, for alloy content, have been established p. 132). A price formula has been established for malleable castings (p. 42).

Inland Men Answer America's Call with Millions of Man-Hours

At Inland every man is keyed to his job. He knows that a full hour's work, every hour, by every man and machine, is the solemn obligation each worker owes to America in this time of crisis. That is why Inland men, working day and night, will give about 43,000,000 man-hours to America's war effort in 1942.

Inland maintenance men are faithfully keeping equipment fit for continuous maximum production—Inland steelmakers are producing the finest steel, in greater quantities, than ever before—Inland metallurgists are following every step in the control of quality, and are spending endless hours searching for new steels and better methods with which to serve America.

Every available piece of Inland equipment is in use. Idle machine hours are at the irreducible minimum. Every hour of every machine is counting more than ever before—and, output per machine is record high.

Here and there throughout the plant, Inland engineers and construction men are rushing new projects—projects that will soon provide America with more Inland man-hours, machines, and steel.

Inland men, answering America's call by putting 60 work-minutes into every work-hour, will produce millions of tons of vital steel before the close of 1942.

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATE • STRUCTURALS • PILING
RAILS • TRACK ACCESSORIES • REINFORCING BARS

Dedicated to Victory

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

AS THE EDITOR VIEWS THE NEWS

STEEL

June 8, 1942

INVESTIGATIONS, INCENTIVES AND WARTIME PROFITS

Investigation of war profits of the Lincoln Electric Co. by the House Naval Affairs Committee raises three points of interest to industry: (1) Tactics employed by the committee's counsel, (2) possibilities of incentive pay and (3) the question of what constitutes profiteering.

In the Lincoln case, which is typical, the committee's counsel released to newspapers only information which would reflect adversely upon the company. He cited bonuses and salaries for 1941, but not for previous years. He compared selling prices and costs — before taxes and before deducting certain important cost items.

This practice of releasing damaging information and withholding mitigating or explanatory data is unfair. Even if the accused later thoroughly justifies his behavior, his story never quite catches up with the counsel's initial destructive charges. These tactics should be modified.

The second point — incentive pay — deserves more attention than it has received. Weeks before the investigation, James F. Lincoln presented figures to members of the Associated Business Papers showing that whereas the profits of the Lincoln company remained stationary, the selling prices of its products had been reduced drastically over a long period of years while the income of employes had mounted sharply.

These figures show conclusively that efficiently operated private enterprise is the real fountain head of a more abundant life. The Naval Affairs Committee evidence simply reveals that for eight years the Lincoln achievement has been accentuated by a bold incentive plan.

This plan is simple. In 1934 salaries were scaled down to permit the company "to skate through a tough period without going broke." Liberal bonuses, keyed to productivity, were introduced. The plan has worked amazingly well. Its success should prompt industry to review its study of incentives.

The third point — the question of what is a fair profit on war orders — merits careful study. The government's attitude so far is not helpful; it puts too much stress on what the government pays to the contractor and not enough on what the contractor contributes to the war effort. On the other hand, some contractors are prone to value their contributions too highly.

Impartial experts should be able to place an equitable value upon war work. Why shouldn't government and industry work toward a yardstick of fair compensation for war performance?

E. L. Shaner

Editor-in-Chief

Is your plant between

"The Devil and the Deep Blue Sea" as it faces . . . .

CONVERSION OR SHUT

FROM HERE OUT, this one test must be applied to every decision regarding business—*"Does it help win the war?"*

That means producers of nonessential items must stop present operations to make their facilities, raw materials and manpower available for essential war production.

That means construction of new plants that cannot get into production quickly must be stopped.

That means your plant must get into essential war or civilian production or shut down for the duration.

If you have been foresighted, you already have or are lining up your facilities to key them into our war production effort.

If you have not been foresighted, you yet have a few short weeks in which you can change over your plant before the general stop-production order goes into effect in August.

BUT YOU MUST ACT, YOU MUST GET GOING QUICKLY, for right now you are in the war economy. Your business' chance of survival depends upon how fast you can get into production of war goods or civilian necessities.

What to do? Let table on p. 33 be your guide to war work. It shows what others have already done.

Let's see what the steps to conversion really involve!

Step One: Put a good engineer on the job full time, for engineers as a rule appear best able to convince government officials of your ability to handle war production work. Too, an engineer familiar with your production equipment and what it will do is in the best position to see production possibilities for your plant as he contacts the various government agencies and prime contractors. True it is that many men in the selling branch of a business have successfully obtained war work for their firms, but since technical production problems are usually involved in converting to war work, a technical man will usually be able to present your plant's abilities more effectively.

But whatever you do, assign some one man to following through on your war production and conversion program—some man who can head the whole effort and co-ordinate the work of your various departments and officials as they seek to get your plant into war work.

Step Two: Make a detailed survey of your facilities. This means making up your war sales kit. To show your ability, experience and equipment clearly and in detail and to make it a forceful hard-hitting selling piece, it should cover:

—Your business background—what products you have made and with what success.

—Any previous experience in war production.

—Any peacetime production experience which in any way fits you

Much of the information here was obtained from the booklet, *Producing for War*, published by Research Institute of America, 292 Madison avenue, New York.

Fig. 1—Instead of juke boxes, this manufacturer is now making control instruments for the Army and Navy, based on the juke-box selection device formerly made. Here a workman is busy setting up a precision cylindrical grinder

T DOWN?

Fig. 2—The technical skill this worker has developed in running multiple drill presses will soon be utilized in war work, for as soon as juke boxes now in process of completion are finished, electrical control devices will be made for the Army

especially for the kind of war production job you seek.

—Financial statement.

—Earnings record for a representative number of years.

—List of important customers.

—Description of your plant, its construction, age, floor space, land available for expansion, etc. Photos help.

—Location of your plant.

—Transportation facilities.

—List of machine tools and equipment, describing in detail the types, sizes, manufacturer and serial numbers, age, state of repair, previous use, etc.

—Tolerance to which shop usually works and closest tolerance to which shop has worked.

—Complete description of your assemblage facilities, special processing equipment, tool and die equipment, plating equipment, foundry equipment, etc.

—Describe facilities for handling materials in process.

—Power sources.

—Shipping facilities.

—Water supply.

—Number of hours each machine is idle weekly. THIS IS IMPORTANT.

—Experience and ability of each member of the managerial and supervisory staff, engineering and technical personnel.

—Number and type of skilled workers now employed.

—Labor history—turnover, strikes, etc.

—Wage rates.

—Make-up of personnel—migratory, alien, etc.

—Available supply of workmen—competition from other plants, prevailing wage rates, etc.

—Number of shifts now operating and length of each. Number of shifts which could be worked with available workmen.

—Your plans for war production, studies made or other background for these plans.

—Something about your production methods.

—Training efforts and possibilities for handling more exacting work.

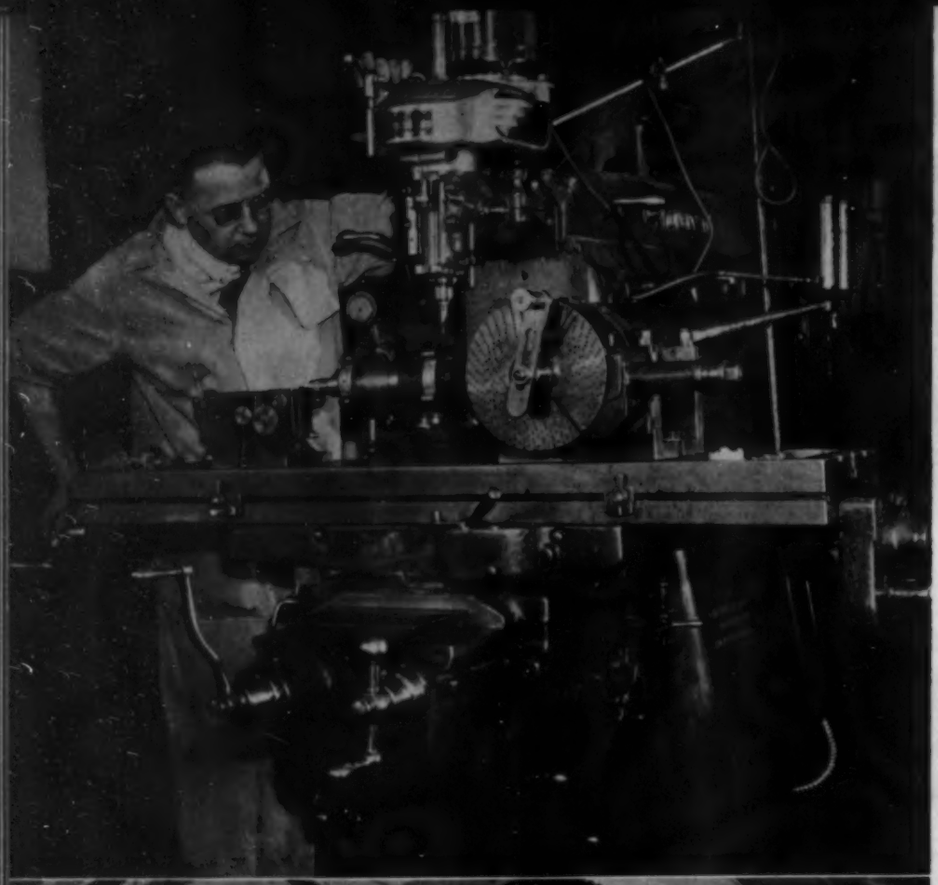
—Additional factory space available.

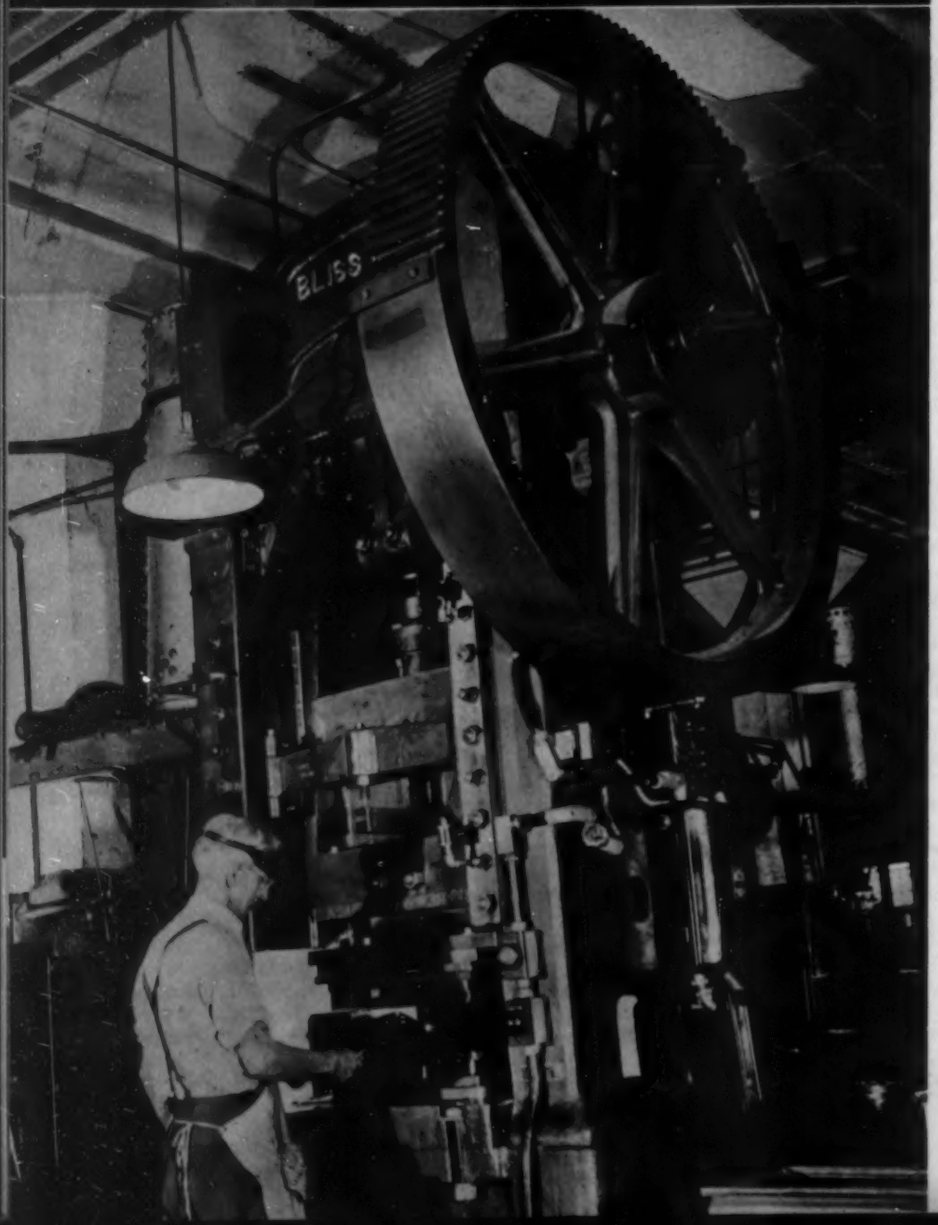
—Inspection facilities available.

Prepare your case as forcibly and effectively as you know how. Use every selling device that you know to impress military procurement men with your experience and ability, your financial strength, your engineering and production talent, your machine and manpower, your general reliability and every other factor on which you try to sell your normal customers. *Use this sales kit on every man you contact in seeking war work.*

Use price as a selling weapon. Although the Army and Navy want munitions and ordnance at any cost, price is still an important factor. Cut your price to the bone if necessary to get your plant started on war work.

Third Step: Get in touch with your nearest field office of the Contract Distribution Branch of the War Production Board. See list in STEEL, April 20, 1942, Section Two, p. 26. There you will be placed in contact with prime contractors who may be able to use your machines and manpower. There your facilities will be registered and made known to others who may need them. There you will be able to





examine exhibits of parts wanted. There you will find specialists to advise what further steps you can take.

Step Four: Get a copy of *Army Purchase Information Bulletin* from the Office of the Under Secretary of War Department, Washington, and put yourself in touch with your nearest Army district procurement office. The bulletin mentioned carries complete details on Army purchasing methods, items purchased, and through what offices; details on bids, etc.

Step Five: Write the Navy's Bureau of Supplies and Accounts, Navy Department, Washington, for a copy of the booklet, *Selling to the Navy*. It carries corresponding information on Navy buying activities.

Step Six: Write Research Institute of America, 292 Madison avenue, New York, for a copy of its publication, *Producing for War*. There you will find many other suggestions as to offices of government buying agencies and how to contact them effectively.

Step Seven: Find out where your nearest local office of the Ordnance Department is and visit it to see the exhibits of needed war items and to consult with Ordnance Department officials on how to get into war work.

Step Eight: From all these sources, you will have before you a wide assortment of exhibits, blueprints, specifications, shopping lists, bid lists, etc. Study these carefully and explode the likely looking items into "bits and pieces".

Step Nine: Check the operations required to produce and assemble the parts. Perhaps you will find some you are not sufficiently experienced to handle.

Step Ten: Make a list of the things that you may be able to handle. List them according to the demand for them.

Step Eleven: Check your machines, tolerances, assembly facilities to see what jobs on the list you can turn out with a minimum of new machinery and rearrangement and with a maximum of volume and speed. If possible, remember it is desirable to start out

Fig. 3. (Above)—This operator is already doing war work. He is using a universal milling machine equipped with a high speed vertical milling attachment. All photos from Office for Emergency Management, by Gruber

Fig. 4. (Left)—Here's a big die stamping press rated 130 tons and formerly used for blanking and forming sheet metal parts. Now it makes cases for control instruments for our armed forces. By the middle of March, more than 12 of the 30 companies making automatic phonographs (juke boxes) were producing parts for bomb sights, gun turrets, shell fuzes and the like

with something you can surely handle with your available facilities, keeping in mind that these can be expanded later as you get further into war work and procurement officials become better acquainted with what you can do.

Step Twelve: Make up tentative cost estimates and production plans. Make trial runs if possible. Then go after a contract.

REMEMBER, there are several ways in which you can utilize your facilities in war work. First, you may be able to continue making the same thing and shift your market from civilian customers to the Army, Navy, Lend-Lease, etc. Second, you may redesign your product by making minor adjustments that fit it for military use. For example, a shop handling miscellaneous screw machine contracts for automobile plants simply reset a few of its automatics and now produces fuze components.

Third, you may retool to turn out a new and entirely different product. Fourth, you may build an entirely new plant and equip it with new machines for making an entirely new item. Of course, this possibility is practically out now because of the time element. An example of this type of conversion is an oil-well-pump maker who started from scratch and now produces anti-aircraft guns.

Fifth, you may utilize the company's management, technical and supervisory experience and talent to head a group of smaller plants in a "mother hen" setup in which you co-ordinate and supervise their activities; or you may manage a government constructed and owned plant on a fee basis, etc.

Often a comparatively minor adjustment may put you in line for converting to war production. You won't know until you investigate. For example, WPB engineers discovered that a spindle used in construction of torpedoes was almost the same as certain shoe machine spindles. Jewelry manufacturers have been able to use their equipment to make electric meters for the Signal Corps. Manufacturers of common pins have been able to utilize their facilities in making needles and wire work for the Navy.

Study the list of conversions carried in the table. Incidentally, this table includes a fairly complete list of the ordnance items being purchased in quantity for our armed services. Too, it shows how typical manufacturing equipment throughout a wide range of operations has been converted to war production. Studying this tabulation should be of help in suggesting possibilities, for you can probably find in it plants making products similar to yours. Upon noting what items others are making to contribute to our war effort, you should be able to judge where your facilities might fit in.

TYPICAL FACILITY CONVERSION

Peacetime Products:	*War Products:*
Adding machines	Automatic pistols
Agricultural implements	Artillery shell
	Combat wagons and gun carriages
Automatic lead pencils	Ammunition components
Automobile accessories	Shell, 37 m/m
Automobile bodies	Airplane parts
Automobile cranks, brakes, rods, etc.	Fuze, P.D. M 52
Automobile engines and motor cars	Airplane type combat tank engines
Automobile loading devices	M.C. mounts
Automobile steering gears	Machine guns
Automobiles	Artillery projectiles
	Cartridge cases 75 m/m
Automotive specialties	Bullet cores
Batteries, spark plugs, radio parts, roller skates	Fuze, B.D., M 58
Boats and lighters	Pontoon bridges
Bottle caps, bottlers, dairy and packers machine closures and cork insulation	Mounts, tripod cal. .50
Box toes	Scabbards
Buses and trolleys	Machining, 75 m/m H.E. shell
Business machines and appliances	Artillery shell
Canner's machinery	Ammunition boxes
Canning and cooking apparatus	Fuze, P.D., M51 (metal parts)
Cans and food containers	Gas mask canisters
Cash registers and business machines	Bomb fuzes
Casters, wheels, and furniture hardware	Fuze, P.D. M56, metal parts
Clamps, magneto couplings, etc.	Fuze, anti-tank mine
Coin-operated vending machines and ice-cream freezers	Shell, R.F., H. E. 40 m/m
Commercial steel castings	Tripods for anti-aircraft guns
Conveyors, excavators, stokers, chain belts	Mounts T 2, 90 m/m
Cooling systems and equipment	Helmets
Cork and glass products	Shell, 3" M42B2
Cotton mill machines (looms)	Shot, S.A.P., 37 m/m, M74
Cranks, ball	Casing, burster M6
Die casting (non-ferrous)	Booster, M22
Drop forgings	Machining, artillery shell
Electric cleaners, clothes washers, etc.	Mounts, tripod, M.G. cal. .50
Electric elevators	Recoil mechanisms for 3" A.A. guns
Electric equipment	Cartridge cases, 105 m/m Howitzer
Electric fans, dryers, heaters, motors	Flares, A.C., para., M 26
Electric refrigerators	Airplane parts
Electric storage batteries	Fuze, P.D., M48 (metal parts)
Electric utility outdoor equipment	Shell, 75 m/m, M48 (M)
Electric welded pipe	Demolition bombs and torpedo parts
Enameled steel stamping, specialties and signs	Anti-tank mine
Fabricated basic steel products	Armor piercing projectiles
Fabricated piping and air conditioning equipment	Bomb bodies
Fire sprinklers and alarms	Artillery ammunition components
Fireworks and toys	Signals, A.C.
Flexible shafts, electric household appliances, electric shavers, etc.	Fuze, percussion, No. 253
Gas stove burners, valves and lighters	Fuze, percussion, M31 (metal parts)
Glass moulds	Burster, M7 for bomb
Hardware	Cartridge cases, 37 m/m
Heating and cooling systems	Sighting devices, cal. .30 rifles
Household appliances	Fuze, T.S.R., M54
Jewelry	Fuze, B.D. M58
Lawn mowers	Machining shrapnel
Linoleum and floor coverings	Machining, 75 m/m artillery shell
Locomotive type boilers	Track shoe links on tanks
Matches	Aircraft cartridge signals
Metal fabricators and enameling	Shell, 105 m/m (M)
	Case Cart., 105 How.
Metal household specialties	Anti-tank mines, H.E.
Milling and drilling machines, precision lathes, dial indicators and gages	Gages
Mimeograph brand products	Fuze, B.D. M58
Mining machinery	Light combat tanks
Motor cars	Light combat tanks
Motor cooling equipment	Airplane landing wheels
Office furniture	Bomb containers
Oil well and drillers' supplies	Machining, 155 m/m shell
Pipe fittings and valves	Hand grenades
Pipe organs	Saddle frames
Plumbing and sanitary fixtures	Machining artillery shell
Portable machinery, agricultural implements, hydraulic presses, sawmill machines	81 m/m machine mounts
Postal meters	Bomb mechanisms
Precision instruments	Navigation compasses
Printing presses	Gun—howitzer parts. Recoil mechanisms for 155 m/m howitzers
Pumps and woodworking machinery	Machining, artillery shell
Pumps, meters, valves	Fuze, percussion, No. 253, 20 m/m
Radio-phonographs	Bomb fuzes and parts
Radio vibrators, antennas	Fuze, bomb, M103
Rail and wire products	Artillery shell
Railroad cars	Artillery shell forgings
Railroad locomotives	Machining 155 m/m shell
Railway signals	Machining, artillery shell
Razors	Primers, perc., M23A1
Rolled copper plate	Metal components for ammunition
Rolled steel products	3" anti-aircraft gun forgings
Roller skates, wheels, keys, etc.	Metal pts. for boosters
Sash doors, and blinds	Cart. cases, 37 m/m, M17
Screens—steel sash, dies, pulleys	Fuze, P.D., M52
Screw machine products, milling machines, and hair clipping machines	Projectiles, ball, 20 m/m
Sheet metal novelties	Links, for 20 m/m gun M1
Shoe and harness machinery	Shot, A.P. 20 m/m
Shoes—men's	Helmet linings
Silk ribbons (also silk goods)	Silk, parachute, pyrotechnics
Springs and metal stampings	Gas mask parts
Steel-lead containers	Ammunition adapters and boosters
Steel products	Forgings, 75 m/m H.E. shell
Steel vaults	Shell, 105 m/m (M)
Stoves, sheet metal products, etc.	Metallic belt links
Textile mach.	Mounts, tripod
Textile trimmings, etc.	Ammunition belts
Tools, dies, jigs, fixtures, gages, and special machines	Gages, mfg. 37 m/m guns
Vacuum cleaners	Gas mask parts
Valves, cocks	Shell, 20 m/m, H.E. (metal parts)
Washing and ironing machines	Anti-tank mine H.E., M1
Watches	Mechanical time fuzes
Watch bracelets	Booster, M22
Wheelbarrows and road scrapers	Ammunition carts for machine guns

How Alternate Materials Aid in Conserving Nation's Scarce Metals

Increased output of military weapons from limited supplies of critical goods is new keynote of war effort . . . General Electric engineer explains use of substitutes to save aluminum, tin, alloy steels, copper, chromium and nickel

MORE production from available materials. This goal, enunciated by Donald M. Nelson and other high WPB officials, as well as by engineers and industrialists, increasingly will keynote the country's war effort.

It will entail closer conservation of critical materials by use of alternates and more effective salvage of scrap.

Much already has been accomplished; much more is necessary.

Necessity for saving scarce materials through use of substitutes, especially in nonfunctional parts, was recognized when the "defense program" first was started. It became more acute with the decision to lend-lease aid to the democracies. It became of vital importance with this country's entry into the war, and the subsequent intensification of the armament program, ship sinkings and enemy occupation of the sources of many of the critical materials.

Rapidity with which the conservation measures were made necessary has made it extremely difficult for engineers to change over specifications to utilize noncritical materials, but in many cases it has been done.

Early in the program the defense agency asked technical committees of the American Iron and Steel Institute and most of the engineering societies to investigate what substitutions could be made. Resulting data eased the problem of many manufacturers when WPB forbade the use of the scarce materials in non-war articles.

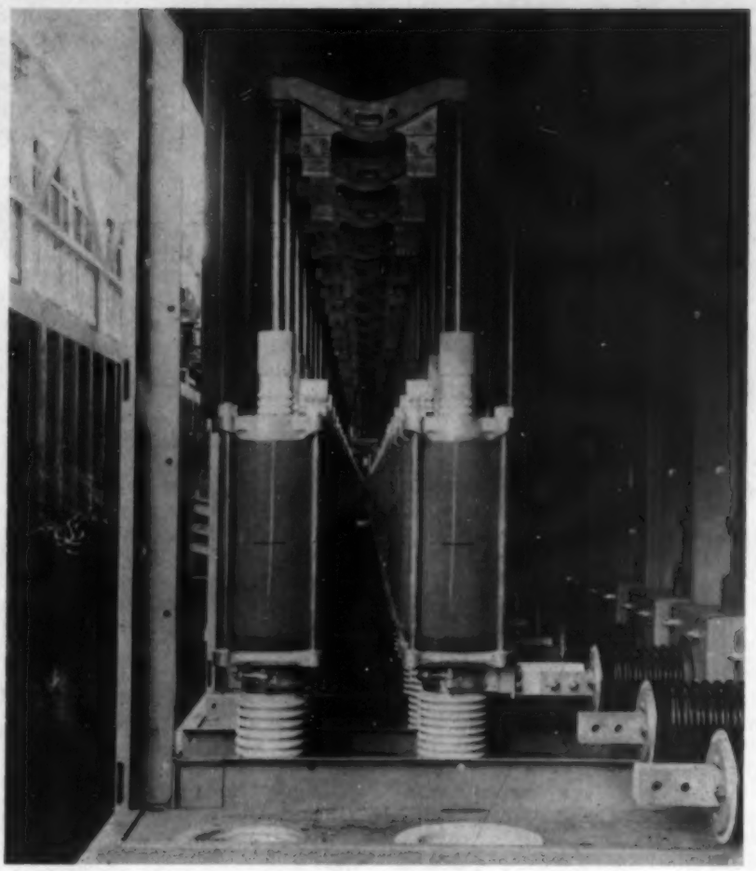
As a result much progress has been made in saving tin through use of nonmetallic containers; and the installation of electrolytic plating lines. Silver plating was revealed as a satisfactory substitute for more critical materials; now the Treasury's silver hoard will be used as a substitute for copper.

Iron powder was studied as a substitute for bronze. Lead base coatings, and in some cases nonmetallic inorganic and organic coatings, were found satisfactory where zinc formerly was used. Now one culvert manufacturing subsidiary of a steel producer is using wood for steel—as a war expedient.

Manufacturers of fluorescent lighting fixtures are studying replacement of steel and metal with such substitutes as laminated paper, hard board, pressed wood, plastics and asbestos cement.

The figures some companies

JOHN HORN, General Electric engineer, displays samples of armature connections made with low tin content solders and a motor bearing with lead-base babbitt. General Electric is saving about 200,000 pounds of tin annually by such substitutions



CAST or fabricated steel has replaced aluminum in the crossheads of these cubicle switchgears, having type FH, 15,000-volt 2000 amp oil circuit breakers. By this substitution, General Electric Co. is saving 75,000 pounds of aluminum annually

quote on savings of scarce metals are impressive. For example, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently announced 2,000,000 pounds of brass and other vital war materials will be saved yearly as result of substituting thinly-coated iron and steel lamp bases for brass.

General Electric Co. is saving 350,000 pounds of aluminum annually by using other materials in nameplates of GE products.

John Horn, of GE's Engineering General Department, speaking before the Northeastern District meeting of the American Institute of Electrical Engineers at Schenectady recently, gave a comprehensive presentation of his company's program and the savings that are being accomplished in scarce metals.

As early as the fall of 1940, GE engineers and metallurgists, he said, saw the possibility of severe shortages in some metals that now have a high scarcity rating. This was particularly true of aluminum and steps were taken to keep aluminum out of new designs and to replace aluminum in any redesigning efforts on existing apparatus.

Refrigerator trays were changed to copper and then to steel. Stainless steel in refrigerator evaporators was replaced by carbon steel. Various household equipment, formerly made of aluminum, was changed over to steel.

In general, conservation has been resolved into three classes, Mr. Horn explained. One is by straight substitution involving a direct change from one material to another without any significant modifications in design or in application. A second class can be visualized to involve a reduction in the quantity of material used, which often requires the finding of new ways of using and fabricating the material in question.

Structurals More Easily Replaceable

A third class may take in the change to alternates with a consequent need for changes in design and most likely also in manufacturing.

Specifically, Mr. Horn explained what the company has done to conserve aluminum, tin, alloy steels, copper, chromium and nickel.

"All of these materials," Mr. Horn said, "have a conspicuous place on the long list of materials which have been used freely heretofore in GE design and production. Some of these materials are more easily replaceable than others, and this is especially true of those that are used for structural purposes as contrasted with operational functions. It is natural therefore that the conservation effort has been most effective in eliminating or reducing the consumption of these structural materials.

"Except for alloy steel, aluminum stands foremost among those of the foregoing materials that have usage principally in structural members, not considering the application of aluminum as conductors in cast squirrel-cage motor rotors, in large rotating apparatus windings, and in busbars. Its use in structural parts is largely predicated upon its light weight, its corrosion resistance, and the relative ease with which it can be formed or cast into the desired shape.

Steel Favored Substitute

"For most of its structural uses in sheet form or in rolled shapes the commonly applicable substitute is steel, whereas when it comes to die castings, zinc is taking more and more of its place although bronze also figures as its substitute.

"To mention but an example, the latter is true in the case of brush holders where zinc tends to lead to the troubles of sticking brushes. Recently, very promising fabricated steel brush holders have also been produced as replacements for aluminum holders.

"The largest reduction on record to date in the General Electric Co., in the effort to make substitutions for aluminum, covers some 5 million pounds of aluminum which were eliminated in one year's time prior to December, 1941, from the production of household refrigerators—a now extinct line.

"Other sizeable reductions in the yearly consumption of aluminum include 1,300,000 pounds in meter production, 550,000 pounds in industrial control gear, 360,000 pounds in street lighting equipment, 200,000 pounds in lightning protective devices and 165,000 pounds in switchgear construction. A list of similar reductions in the manufacture of other lines of apparatus would be a lengthy one but the foregoing may be sufficient as indications of what has been accomplished in a serious effort to conserve aluminum by substitution.

"Turning back to the reduction accomplished in the industrial control branch, the largest item by far takes in structural members and enclosing cases which have been changed over mostly to steel. A few of the other major items take in cast aluminum bases and bearing brackets where zinc has figured prominently as a replacement material. It may be interesting to

(*Please turn to Page* 59)

Allocation Classification Plan Established by WPB

◆

Symbols must be placed on all orders by manufacturers, fabricators and primary producers after June 30, and on all orders which call for delivery after July 31 . . . End-use of materials must be identified

◆

WASHINGTON

SIMPLE, uniform classification system which will enable the War Production Board to trace the flow of materials in terms of end-use, from primary producers to finished products was announced by the board last week.

The new allocation classifications, to be used on purchase orders and reports to WPB, will supersede a variety of use classifications now required under materials ("M") orders.

Allocation classification symbols must be used on all orders placed by manufacturers, fabricators and primary producers after June 30, and on all such orders which call for deliveries after July 31, regardless of when the orders for materials were placed.

To facilitate use of the symbols, they should be placed on purchase orders at an earlier date wherever possible.

Applications under the Production Requirements Plan for the fourth quarter of this year must identify the end-use of materials for which application is made by means of this standard allocation classification. The symbols will thus become a principal method of checking the requirements and distribution of materials for war and essential civilian purposes.

The classification is comparatively simple. Numbers from 1.00 to 23.00 have been assigned to all major classes of military, industrial and civilian uses. These broad end-use classifications are subdivided as necessary by the use of numbers after the decimal point. For example, class 11.00 — communications — has under it subclass 11.10, telephone; 11.20, radio; 11.30, telegraph. The order of the numbers bears no relation to the relative importance of the use.

In addition, letters known as purchasers' symbols are assigned to broad classes of purchasers, including Army, Navy, foreign purchasers, etc. Both the allocation and purchasers' symbol will be placed on each contract or purchase order, so that the supplier and the WPB will be able to ascertain the end-use of the material ordered and the classification of the purchaser.

Information obtained by use of the symbols will make possible a more accurate and effective allocation of materials to war requirements and to maintenance of essential civilian industries such as transportation, electric power, health supplies communications, etc.

The complete allocation classification is accompanied by an explanation and directions for use, which will make it easy for a producer to identify the symbols applicable in his business. Once these symbols have been identified, their use will be a fairly easy matter.

All companies required to use the classification should place the appropriate symbols directly on all of their purchase orders, if they know the classification for which the material they order is to be used. Intermediate users and suppliers who do not have this information should receive it, as the classification comes into general use, on the purchase orders addressed to them, and should transmit the symbols on their own orders.

ALLOCATION CLASSIFICATION SYMBOLS

(NOTE: The symbol numbers have no relation to order of importance.)

MILITARY

Allocation Symbol

Class 1.00—Aircraft—Production and Maintenance (complete except for armament and ammunition—as approved by the Joint Aircraft Committee).

Class 2.00—Ships, Production and Maintenance (complete except for armament and ammunition).

2.10 Battleships.
2.20 Aircraft Carriers.

Anglo-American Production Chiefs Study Problems

WAR Production Board Chairman Donald M. Nelson offers a light to Oliver Lyttelton, British Minister of Production, as the two began a series of important conferences on Anglo-American war production problems. NEA photo

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended June 6	Change	Same week 1941	Same week 1940
Pittsburgh	95.5	+ 1.5	100.5	80
Chicago	104.5	— 2.5	101.5	86
Eastern Pa. ...	96	+ 5	97	73
Youngstown ...	94	None	97	67
Wheeling	81.5	+ 3.5	88	79
Cleveland	94	None	93	82
Buffalo	90.5	None	93	84
Birmingham ..	95	None	95	85
New England ..	89	— 6	90	66
Cincinnati	91.5	— 3.5	91.5	70
St. Louis	98	None	98	56
Detroit	87	— 5	92	75
Average	99	None	*99	*81.5

*Computed on basis of steelmaking capacity as of those dates.

2.31 Escort Vessels (aircraft), combat, loaded transports, and combat loaded cargo ships.
2.32 Patrol Vessels.
2.33 Landing craft including the following types: APM, ATL, YTL, tank lighters, artillery lighters, landing boats, support landing boats.
2.40 Light Cruisers.
2.50 Destroyers including escort vessels.
2.60 Submarines.
2.70 All other types of naval craft.
2.80 Repairs to all naval vessels.
2.90 Ships for Maritime Commission.

Class 3.00—Vehicles—Production and Maintenance (complete except for armament and ammunition).
3.10 Tanks and armored vehicles—all types.
3.20 Vehicles, except rail—all other military types.

Class 4.00—Armament and Weapons—Production and Maintenance (complete mounts and related equipment).
4.10 Aircraft.
4.20 Anti-aircraft, Barrage Balloon Equipment, A. A. Searchlights.
4.30 Artillery including railway and seacoast.
4.40 Fire control, all types.
4.50 Machine guns—ground, hand arms.
4.60 Naval, all types.
4.70 Tanks and anti-tank.
4.90 Weapons of all other types.

Class 5.00—Ammunition—Production and Maintenance (complete items).
5.10 Ammunition 20 mm. and above.
5.20 Ammunition, small arms below 20 mm.
5.30 Bombs, depth charges, mines, and torpedoes.
5.40 Propellants, chemicals, explosives.
5.50 Pyrotechnics.

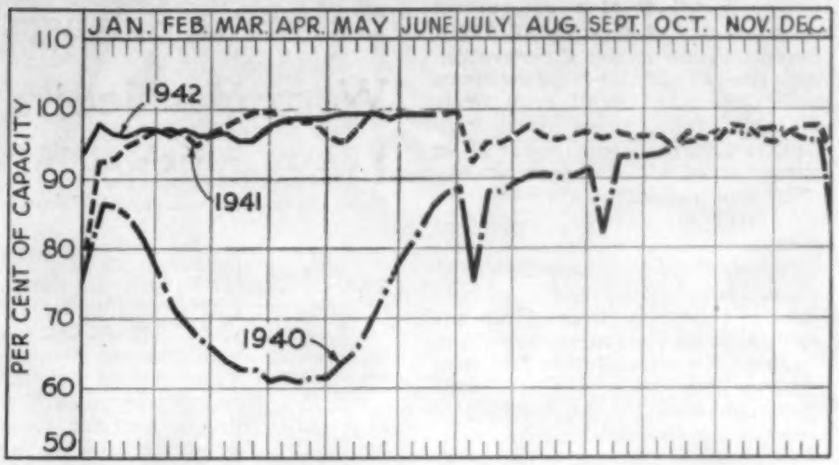
Class 6.00—War Equipment and Supplies—Production and Maintenance (complete with related equipment).
6.10 Chemical Warfare equipment and supplies.
6.20 Clothing, general supplies and subsistence.
6.30 Mapping, Map Reproduction and photographic equipment.
6.40 Medical Equipment and supplies.
6.50 Military field construction equipment.
6.60 Military radio and wire communications, and Radar or electronic equipment—all types.
6.70 Military railway including rail vehicles and bridge equipment.
6.80 Supplies and equipment—all other military types.
6.90 Supplies and equipment—all other types.

Class 7.00 — War Facilities — Construction and/or Maintenance.
7.10 Air Fields, Bases, Camps, Coast Defense, Depots, Forts, Navy Yards, Posts, Stations —Continental U. S. A.
7.20 Air Fields, Bases, Camps, Coast Defense, Depots, Forts, Navy Yards, Posts, Stations—outside Continental U. S. A.
7.30—Munitions manufacturing facilities and proving grounds—government owned.
7.40 Panama Canal.
7.50 Shipyards and ship repair facilities—government owned.

INDUSTRIAL AND CIVILIAN

Class 8.00—Raw Materials, Production and Processing of.
8.10 All Metals, Production (including min-

(*Please turn to Page* 134)



PRODUCTION . . . . Steady

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 99 per cent. Three districts advanced, four declined and five were unchanged. A year ago the rate was 99 per cent; two years ago it was 81½ per cent, both computed on capacity as of these dates.

Youngstown, O.—With scrap supply "just sufficient", steel production held at 94 per cent last week, 75 open hearths and three bessemers active. Republic Steel Corp. added an open hearth at week-end and plans to keep it in operation. This indicates 95 per cent production this week.

Chicago—Dropped 2½ points to 104½ per cent for furnace repairs. Scrap supply is adequate for current use. Two of the district's six plants operated above 100 per cent.

St. Louis—Steady at 98 per cent; expected to continue in view of sufficient scrap and absence of impending furnace repairs.

Cleveland—Held at 94 per cent for the second week.

New England—Receded 6 points to 89 per cent, with one interest continuing at 100 per cent.

Buffalo — Furnaces returned to service after repair balanced those taken off and the rate remained at 90½ per cent, fourth consecutive week.

Cincinnati—Loss of 3.5 per cent, to 91½ per cent resulted from furnace repairs.

Birmingham, Ala.—Unchanged at 95 per cent, 23 open hearths producing.

Central eastern seaboard — Recouped the preceding week's loss from flood interruption, rising 5 points to 96 per cent. Alan Wood Steel Co. plans to blow out a small blast furnace July 1 for relining.

Detroit—Off 5 points to 87 per cent mainly for repairs.

Pittsburgh—Several furnaces were relighted after repairs, advancing the rate 1½ points to 95½ per cent.

Wheeling—Completion of repairs raised production 3½ points to 81½ per cent.

Steel Industry Sponsors $1,500,000 Advertising Campaign on Salvage

NEW YORK

A $1,500,000 to $2,000,000 advertising campaign on salvage was announced last Friday by Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., and chairman of the scrap committee, American Iron and Steel Institute, New York.

The campaign, which is being organized by the iron and steel industry, is educational in character and broad in scope. It will present not only vital need for scrap iron and steel for war production, but will deal also with rubber, nonferrous metals, cooking fat, tin cans, and other salvageable materials.

McCann-Erickson Inc., 50 Rockefeller Plaza, New York, has been selected to handle the advertising campaign developed by Leo Burnett and a group of Chicago advertising agencies under the auspices of the advertising council. Mr. Burnett will continue to supervise the campaign through its initial stages.

This advertising, which is expected to start early in July, is one of the first industry-sponsored cam-

paigns in behalf of a government program. It has approval of WPB's Bureau of Industrial Conservation. Advertising will run in newspapers, both dailies and small town weeklies, magazines, radio, trade journals and farm papers and will be synchronized with the government's own information program to put the facts on salvage before the public.

Industry and government have already been co-operating successfully in collection of scrap iron and rubber from farms, where farm implement manufacturers and their dealers have been providing additional facilities for the trucking of rural scrap into town.

The overall program initiated by the iron and steel industry will be co-ordinated with a special campaign on cooking fats sponsored by glycerine and soap industries.

The salvaged materials will flow back to war industries in accordance with government regulations.

Harvester Salvages Worn Machines In Special Shop

CHICAGO

CO-OPERATING with the Army, International Harvester Co., has set up a special plant entirely devoted to building, rebuilding, or revamping machine tools needed for the company's extensive war production program. This program was launched in an effort to overcome the critical shortage in production equipment.

Need for the plant became apparent when the company undertook its first defense production job; namely, 75-millimeter shells in its Milwaukee factory, and was confronted with a lack of adequate tool equipment. A shop was established on a small scale to meet this deficiency, from which evolved the present special machine tool works, in Cicero, Ill., in quarters formerly occupied by a manufacturer of printing equipment.

This property is now owned by the War department and leased to Harvester on two five-year leases, one with the Ordnance department, covering machines and equipment, and the other with the Engineering Corps, covering land and building.

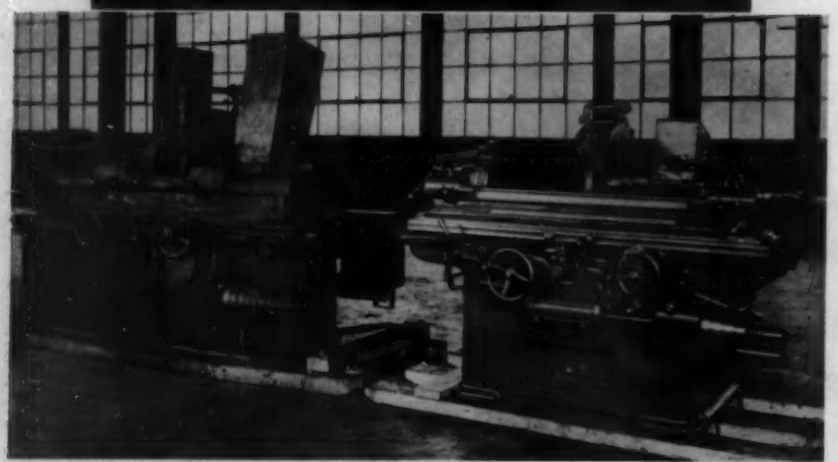
Under direction of Clarence D. Bending, supervisor of machine tools for the company, the new plant is operated by about 60 highly-skilled machinists, who are equipped to handle and rebuild practically every type of machine tool except multispindle automatic screw machines.

Oldest machine tool rebuilt so far is an engine lathe purchased in 1905 and which now is in production cutting metal for an armament product and doing a good job, as are numerous other units whose ages range from 10 to 25 years.

Production of new machine tools, in whole or in part, is being contemplated and discussions with machine tool manufacturers are now going on, looking toward the company's possible manufacture of parts for new machines being built by other companies.

Prior to the outbreak of war, Harvester adopted the policy of not selling surplus or obsolete machine tools unless the prospective purchaser was to use the tools on defense work. Later, many of these tools were sold for such purpose; others were reinstalled in the company's plants. Still other tools in poor condition were scrapped after useful parts had been taken from them to serve as repairs for similar machines.

Hundreds of the machine tools had been in service for several years and required general overhauling and refitting before applying them to war work. Other tools, not usable on war work, were made useful by rebuilding them to do new jobs. Still others, which had not been in use in years, were restored and put to work.



◆

MILLING machine rebuilt in Harvester's special machine tool shop is inspected by Clarence D. Bending, supervisor, before shipment to one of the company's manufacturing plants

Left: These two precision grinders came from the same "junk yard" at one of Harvester's plants. The one on the right has been completely rebuilt; the one on the left awaits its turn for rebuilding

REVISIONS AND ADDITIONS TO

PRIORITIES – ALLOCATIONS – PRICES

as published in Section Two of STEEL, April 20, 1942

"M" ORDERS

M-9-c-3 (Amended): **Copper,** effective May 30. Permits use of remaining stocks of bronze powder in hands of other than manufacturers by printing and publishing industry and for other decorative purposes, until Dec. 15, 1942. Manufacture of bronze powder still prohibited.

M-63 (Amendment): **Imports of Strategic Materials,** effective June 1. Extends import control to include iron and steel, aluminum, copper, lead, tin and magnesium in various categories of scrap and alloys. Does not prohibit importation under existing contracts.

M-104 (Amended): **Closures for Glass Containers,** effective May 30. Limits use of blackplate for making closures for beer and nonalcoholic beverage bottles to 60% of tonnage used in 1941. Prohibits use of tinplate or terneplate immediately in making closures for wine or distilled spirits. Blackplate for latter barred Aug. 1; use meanwhile limited to extent required—after exhausting inventories—to fill orders which would bring bottlers' stocks to tonnage equal to amounts used during May, June, July, 1941. Does not apply to scrap or reclaimed material.

M-137 (Amended): **Benzene,** effective June 1. Provides for complete allocation. Buyers seeking delivery apply on PD-223-A. Producers and distributors file PD-224-A. Permits sale of coal tar derivative oils containing benzene only when buyer is prepared and equipped to extract maximum amount of benzene. Use as motor fuel prohibited.

M-142 (Amendment): **Naphthenic Acid and Naphthenates,** effective June 1. Exempts cleaning compounds and certain lubricants containing naphthenic acid or naphthenates from restrictions of order. Permits manufacturers to use naphthenates in their possession on May 4, 1942.

M-150: Aromatic Petroleum Solvents, effective May 25. Limits deliveries of such solvents, including toluol and xylol, to orders bearing high ratings—A-2 or better beginning June 15. Producers must accumulate before July 1, inventory of at least 25% of average monthly production first four months of 1942 for distribution by Director of Industry Operations; such stock to be replenished upon withdrawals. Balance of production after filling rated orders and setting aside inventory stock is to be diverted to production of nitration toluol or aviation gasoline as directed by WPB.

M-158: Drum Exterior Coating, effective May 30. Restricts use after June 20 of coatings containing certain organic binders or pigments for coating steel containers of two gallons or more capacity to export use (except coatings containing tung or oiticica), or orders for Army, Navy, Coast Guard or Maritime Commission. Coatings after June 20 limited to black, except small areas required for marking or legal requirements.

M-159: Butyl Alcohol, effective July 1. Provides for complete allocation. Buyers apply on PD-505; producers and distributors report on PD-506. Producers may deliver not over 2% of monthly output to persons using less than 54 gallons monthly, without allocation.

M-160: Beryllium, effective June 1. Provides for complete allocation. Consumers file requests for allocation on PD-496 by 20th of month, also PD-497 monthly. Latter form also required of any person having 10 lbs. or more of beryllium (contained) in possession in any month. Permits delivery of beryllium without allocation, until July 1, to produce articles rated A-1-c or higher.

M-161: Refractories, effective June 1. Lifts inventory restrictions on various materials used in manufacture of refractory material for heat-treating furnaces.

M-162: Platinum, effective May 30. Requires persons having 1 or more troy ounces of platinum in their possession May 31 (except in certain specified industrial forms) to report to WPB on PD-512. Sales must be reported by the 15th of each month on PD-513, purchases by same date on PD-514. Sales and purchases limited to refiners, dealers, distributors, processors and consumers.

M-163, 164, 165, 167, 168, 169: By-product ammonia and sulphate of ammonia; synthetic ammonia, cyanamid; capryl alcohol; isopropyl alcohol; methyl ethyl ketone. Provides for complete allocation, effective June 1 on the first three, July 1 on remainder. Producers and distributors file PD-237 by 10th each month.

M-170: Styrene, effective June 1. Provides for complete allocation. Buyers file PD-516 with orders to suppliers; producers file PD-515 monthly with WPB.

M-171: Chlorate Chemicals, effective June 1. Provides for complete allocation. Buyers file PD-516 with orders to suppliers; producers file PD-515 monthly with WPB.

"L" ORDERS

L-13-a (Amendment): **Metal Office Furniture,** effective June 1. Exempts wood filing cabinets, containing not more than 2 lbs. of essential steel hardware for each drawer, from limitations of order.

L-26-c: Farm Machinery, effective June 15. Restricts use of copper in manufacture of farm tractors and engine power units to specified essential operating parts. Steel backed bearings must be substituted for solid bronze bushings where practicable.

L-29 (Amendment): **Metal Signs,** effective June 2. Exempts all mechanical and electrical railroad, grade crossing and highway signals from restrictions of order.

L-37-a: Musical Instruments, issued May 29. Covers instruments containing more than 10% by weight of critical materials. Prohibits processing such materials, beginning June 1. Assembly permitted for one month (two months for pianos and organs) at rate allowed preceding three months under L-37. Production of instruments containing not more than 10% of critical materials permitted at rate of 75% of use of critical materials in those instruments in 1940. Replacement part production limited to 75% of 1940 rate.

L-42 (Addition): **Plumbing and Heating Simplification.** Schedule X, effective June 16, prohibits production of electric sump pumps and electric cellar drainers except in accordance with stated specifications. Schedule XII, effective June 20, bans manufacture of various plumbing fixtures, including sinks, drinking fountains and bath and wash room items, other than those conforming to defined specifications relating to metal use.

L-54-a (Amendment): **Typewriters,** issued May 30. Permits production of non-portable machines through July by five largest manufacturers at 75% of factory sales rate in 1941; 90% for Woodstock Typewriter Co. Production of portable units limited to 11% of 1941 sales. Manufacturers must set aside each month 35.02% of non-portable unit output for the War Department; 14.04% of portables for Navy Department; and May 30 stocks of non-portables plus 31.5% of March 15-May 31 production and 50.94% of subsequent monthly production for WPB distribution. L-54-a-1 permits July production of non-portables for export equal to 53% of 1941 monthly average factory shipments for five largest interests; 75% for Woodstock; 11% for portables.

L-54-c: Office Machinery, effective June 1, revoking L-54-b. Restricts production through remainder of year to permit sufficient stockpile to take care of all requirements until June 30, 1944. Production quotas fixed for each type of machine. Regulates distribution so that only essential users may obtain machines produced.

L-75 (Amendment): **Coal Stokers,** effective May 31. Permits assembly until Sept. 30 of small stokers composed of fabricated parts in manufacturers' possession May 31.

L-113 (Amendment): **Wood Cased Pencils,** effective May. 30. Permits manufacturers to use until July 1 any pigments and finishing materials they have in stock. Prohibits purchase of any pigment for use in pencils other than carbon black, lamp black, bone black, white, domestic earth colors and ultramarine blue.

L-140: Cutlery, effective June 1. Iron and steel use in making various items limited to following percentages of rate for year ended June 30, 1941: 100% for industrial food processing instruments; 60% for cutlery used in homes, butcher shops, hotels and other commercial establishments in preparation of foods; 35% for cutlery used in serving and eating food, and ordinary cutting scissors; 100% for unessential cutlery until June 30, nothing thereafter.

PRICE SCHEDULES

No. 6 (Amendment): **Iron and Steel,** effective May 30. Allows granting of a lesser discount than 40 cents per 100 lbs. on bale tie wire, if such a lesser discount was customarily granted as of April 16, 1941, by a producer who actually sold bale tie wire to that customer.

No. 136 (Amendment): **Machines and Parts,** effective June 1. Postpones effective date of regulation from June 1 to July 1, pending completion of extensive amendment.

No. 155: Central Hardwood Lumber, effective June 1, 1942. Establishes maximum prices for lumber shipped from mills in Illinois, Indiana, Ohio and portions of Kentucky and Tennessee.

For additional revisions and additions please see STEEL of April 27, p. 30, May 4, p. 46, May 11, p. 55, May 18, p. 46, May 25, p. 42, June 1, p. 36.

WINDOWS of WASHINGTON

By L. M. LAMM *Washington Editor, STEEL*

Additional restrictions issued on use of critical materials in nonessential manufacture . . . Steel warehouse compliance with priority orders to be checked . . . Petroleum industry using less chromium

WASHINGTON

RESTRICTIVE controls over use of critical materials and facilities for nonessential purposes are being tightened day by day by the War Production Board. Last week all construction was brought under regulation (p. 58), production of most musical instruments was prohibited (p. 44), control over regulators, valves and instruments was extended (p. 43), use of black plate for bottle caps was limited (p. 43), and use of certain organic binders for steel containers was restricted.

In addition, WPB sharply curtailed the manufacture of various types of office machinery and set up a system of distribution control so that only essential users may obtain the machines produced.

Such items as adding machines, dictating machines, accounting and bookkeeping machines, addressing machines, time recording machines and other types of office equipment are covered by Order L-54-c. Previously, Order L-54-b and amendments had governed the distribution of office machines, but had placed no restrictions on production.

L-54-c is designed to regulate production until the end of the year that a sufficient stockpile of essential types of machines may be accumulated to take care of requirements until June 30, 1944.

Manufacture of tableware, pocket knives, scissors and other cutlery is curtailed by Order L-140. It permits limited production of three classes—industrial food processing equipment, commercial equipment and essential home equipment—but prohibits manufacture of unessential cutlery such as domestic carving sets, pen knives, boys' pocket knives and manicure implements. Use of alloy iron or alloy steel in any of the items is prohibited and the only metals that may be used are unalloyed iron or steel and gold and silver.

Drastic limitations on the use of copper in farm tractors also has been imposed, under Order L-26-c.

The new order will reduce the amount of copper used in radiators by 40 or 50 per cent, and, at the current production rate for tractors, will reduce copper requirements by approximately 60 tons a month.

No provision is made for the use of copper in starting motors, generators or electrical lighting equipment for farm tractors. The farm equipment industry has had its engineers working for several months to develop substitutes for copper.

The order specifies that no copper products or copper base alloy products may be used, even from inventory, in the production of farm tractors, or engine power units, other than for the following:

Radiators (only for water courses and tanks of copper alloy containing not more than 71 per cent copper).

Cooling control devices, such as thermostats and radiator sealing caps of pressure type only.

Electrical equipment, confined to magnetos, switches and wiring.

Bearings, bushings, thrust washers and similar parts.

Carburetor parts.

Plating for functional parts in connection with carburizing where substituted for solid copper or copper base alloy.

Gaskets.

Warehouse Reporting Form PD-83 Amended

Form PD-83, on which steel warehouses report to the Bureau of the Census on shipments and stocks, has been revised in several respects. On shipments to the Army and Navy the revised reporting system follows the setup in amendment No. 3 and extension No. 2 of General Preference Order M-21. Also clarification of instruction on Schedule B product quotas is effected, as well as several other minor revisions. The form is now being sent to the warehouses for their May reports.

Operations of 800 Steel Warehouses To Be Studied

Operations of 800 large steel warehouses are to be surveyed shortly by the Compliance Branch of WPB.

Questionnaires designed to establish the practices of these warehouses and the degree of their conformity with priorities orders are to be mailed, while 200 investigators of the Wage and Hour Division of the Department of Labor will make the necessary field examinations on behalf of WPB.

Approximately 15 per cent of all iron and steel production is distributed through warehouses and it is essential that these products be stocked and distributed in accordance with the needs of the war.

The Compliance Branch will analyze the completed questionnaires and will initiate punitive action in cases of demonstrated violation of WPB orders.

Request that steel warehouses curtail their quotas of Schedule A products or eliminate them entirely if possible was made last week by the WPB Iron and Steel Branch.

Schedule A products include plates, shapes, bars, rails, armor plate, forgings and other critical products badly needed for war production and for which deliveries by warehouses have been steadily reduced.

Elimination of these products from warehouse stocks for the duration of the war will permit their concentration in places where the war demand is heaviest.

Fishing Tackle Manufacturers May Continue Output to June 30

Fishing tackle manufacturers may continue to produce their wares until the end of June, under an amendment to Limitation Order L-92 issued by WPB.

The original order, issued April 23, provided that such production involving the use of critical materials be stopped on May 31.

Amendment permits another month of production provided the critical materials needed for such articles were in the manufacturer's possession in fabricated form on or before April 23. The amendment restricts the use of iron and steel in June to 75 per cent of a manufacturer's average monthly use of these metals in 1941, which is the same rate of use of iron and steel as was permitted under the original order during April 23 to May 31.

Petroleum Industry Asked To Use Low-Alloy Steels

Steels used by the petroleum industry in most cases contain considerably less chromium and nickel than has been the case in the past, under the conservation program of the War Production Board. This industry has been asked to hold down nickel and chromium to the extent that the alloy steel will stand up in the particular application for a period of three years without reducing the normal service factor by more than 2 per cent.

This means that the petroleum

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industry still has considerable latitude. In some cases where unusual corrosive conditions are encountered 18-8 stainless steel continues to be used. In others the chromium in still tubes has been lowered to as little as 1¼ per cent, while in many instances carbon steel is being employed in catalytic cracking units.

Considerable uncertainty exists as to compositions to be specified. The problem is being studied by the American Petroleum Institute, New York, in contact with Metallurgical Section, Iron and Steel Branch, War Production Board, with essential requirements taken care of under the priorities and allocations system. Oil company metallurgists and steel company metallurgists also are working together as to low-alloy compositions that will have a life of three years in each individual application.

"Several Thousand" Foreign Patents Seized by U. S.

Six hundred patents, most of recent date and many of immediate importance to the American war effort, have been taken over from their German and Italian owners by the Alien Property Custodian. Processes and equipment covered by the patents will be made available to American industry.

Covering recent developments in their respective fields, the patents include many owned heretofore by Junkers and Arado, two of the large German manufacturers of airplanes.

Patents owned by Robert Bosch and covering electrical equipment, particularly in the ignition field, were seized, as were many patents in the fields of radio, television, and aircraft instruments.

Several of the seized patents related to the electron microscope, currently of great importance in scientific fields.

"Several thousand" patents have been seized thus far by the Alien Property Custodian in accordance with the April 21 directive of the President to "seize all patents controlled by enemy aliens, either directly or indirectly".

Surveys currently in progress at the Patent Office will disclose all patents and pending patent applications held in the name of foreign nationals and will permit the Custodian to complete his vesting of the holdings of enemy aliens.

Sump Pump Simplification Ordered To Save Copper

Simplification of electric cellar drainers to save considerable amounts of copper and copper base alloy has been ordered by the WPB, effective on June 16.

Cellar drainers, also known in the trade as sump pumps, are devices for the collection and elimination of excess water from cellars, mines, and other industrial establishments.

The simplification practices, embodied in Schedule 10 to Limitation Order L-42, prohibit the use of copper and copper base alloy in certain parts of the units It is estimated that on the basis of 1941 production, about 400 tons of the critical materials will be conserved for the war effort.

Delivery of any pumps or drainers in stock in finished form on June 16, or those which had been so processed that manufacture in conformity with the schedule would be impractical, is permitted.

Restrictions do not apply to the use of brass, copper, or copper base alloy in pumps or drainers being produced for the Army, Navy, Maritime Commission or Coast Guard where the use of these materials is required by the specifications.

Order provides no brass or copper tubing shall be used in the pump standard; no copper or alloy shall be used in the upper and lower parts of the impeller housing and pump base; no copper or copper base alloy shall be used in the float rod assembly; no copper or copper base alloy shall be used in the float; no copper or copper base alloy shall be used in the impeller; metallic cover shall be eliminated.

Malleable Iron Castings Producers Given Price Formula

Producers of malleable iron castings and high-alloy steel castings have been given price formulas by the OPA for establishing maximum prices for such castings as cannot be priced under section 1499.2 of the General Maximum Price Regulation.

The formulas are contained in Orders No. 4 and 5 for malleable iron castings and high-alloy steel castings, respectively, under section 1499.3 (b) of the General Maximum Price Regulation, which orders became effective June 2.

Formulas are the same as the one issued recently for gray iron castings.

They direct that the maximum price for any malleable iron casting or high-alloy steel casting which cannot be established under section 1499.2 of the General Regulation shall be determined as follows:

"The producer's maximum price for each such casting shall be a net price (after adjustment for all applicable customary extra charges, discounts, or other allowances) not in excess of that at which he would have sold such a casting during March, 1942, under the pricing formula or method of calculating price used by him in March, 1942, employing the same cost factors (wage rates, prices of materials, and overhead) and profit margins which were in effect for him in March, 1942, even though his cost or profit margins may have increased since that date."

Refractory Brick Inventory Restrictions Are Lifted

Inventory restrictions on materials for the manufacture of refractory brick, used in heat-treating furnaces for the manufacture of steel and other products, have been lifted by the terms of an order issued by WPB.

General Inventory Order M-161 exempts 16 materials, none of them scarce, from the inventory restrictions of Priorities Regulation No. 1. Purpose of the order is to encourage purchase of the bulky materials at a time when transportation facilities are not overburdened.

The 16 exempted materials are: Bentonite, kaolin, ball clay, stoneware clay, diatomaceous earth, feldspar, spodumene, potter's flint, domestic andalusite, domestic dumortierite, domestic kyanite, domestic sillimanite, pinite, pyrophyllite, soapstone, and talc.

WPB Issues Booklet To Aid Small Plants in War Work

A booklet on plant efficiency has been published by the WPB Division of Information and is now available for distribution, on request.

The booklet is called *PLANT EFFICIENCY—Ideas and Suggestions on Increasing Efficiency in Smaller Plants.*

It is in simple terms and is designed primarily for smaller war plants or for plants which are just getting into war production and which might be able to increase production by a study of efficiency procedures.

Chapters in the booklet deal with "Good Lighting — Better Work"; "Cutting Down Accidents"; "Adapting Old Machines to New Jobs"; "Maintenance and Repair"; "Longer Life for Cutting Tools"; "Getting the Most out of Machine Tools"; "Production Lines Geared for War"; "Meeting Government Standards"; "Training Workers Quickly"; "Swing Shifts"; "Keeping Track of Orders, Production, and Materials"; "Plant Protection"; "Pooling Facilities"; "A Word on Priorities"; and "Getting Into War Work".

Copies may be obtained from regional and local offices of the War Production Board, located in 20 cities; from local offices of the Division of Information, Office for Emergency Management; or by writing to the Division of Information, Office for Emergency Management, in Washington.

War Production Board Takes Control of Instruments, Valves and Regulators

WASHINGTON

TO CONSERVE nickel, chromium and their alloys, the WPB has assumed control over the production and distribution of many types of instruments, regulators and control valves used in general industrial processing and in the manufacture of war material.

Many of these instruments, highly technical in character, are required by war industries. With the assistance of technical personnel of all interested government agencies, and of the industry, WPB's General Industrial Equipment Branch has drafted specifications for the production of various types of instruments and restrictions on their use, which are incorporated in Conservation Order L-134.

The order covers 28 specific items forming component parts of industrial processing instruments and valves and regulators. In certain cases, it restricts the size and maximum chromium and nickel alloy content of these items. In addition, it limits the use of instruments containing these critical materials to certain specified operating conditions.

Companies producing industrial instruments are experiencing a substantial increase in the demand for their products. It is estimated, on the basis of statistics for 1941, that the restrictions imposed by the order will result in savings this year of at least 283,000 pounds of nickel and 60,000 pounds of chromium.

Outlines Specifications

The order outlines manufacturing specifications for various types of instrument parts, such as valves, nozzles, protective tubings, thermocouples, sockets, etc., and sets forth the use to which these parts may be put.

Under the general restrictions, manufacturers are prohibited from processing any chromium, nickel or alloys of these metals in producing any instrument parts except for use under the operating conditions specified. Thirty days after the date of order's issuance, manufacturers may not deliver any parts except for the specified uses. Effective immediately, they cannot deliver these instrument parts, no matter what the intended use is, except upon a preference rating of A-10 or higher.

Manufacturing specifications set forth in the order take effect 60 days after the date of issuance. After that time, manufacturers must follow these specifications as well as restrict their production to instrument parts designed for the specified operating conditions.

The order also prohibits any person from accepting delivery of any instrument part unless he expects to install the item which is being delivered, and all similar items on hand, within the next 90 days. Persons receiving those parts must certify to manufacturers or distributors that the equipment received will be used only in the operating conditions permitted under the terms of the order.

The order does not apply to any instrument which does not contain nickel, chromium or their alloys, or instruments manufactured prior to May 26. Deliveries intended for the Army, Navy and Maritime Commission will not be affected by the restrictions until 90 days after the issuance date.

WPB Restricts Use of Black Plates for Bottle Caps

To conserve steel, WPB has sharply limited the tonnages of black plate which may be used for beer and nonalcoholic beverage bottle caps, and at the same time completely prohibited use of black plate after Aug. 1, and of tin, effective at once, in the manufacture of closures for wine and distilled spirits.

In addition, WPB enlarged the list of other products for which the use of tin plate or terne plate covers is prohibited. Use of tin in caps for beer and nonalcoholic beverages had previously been restricted.

These conservation actions, embodied in Order M-104 as amended, are expected to save 51,000 tons of black plate and 1500 tons of tin on an annual basis. Some 70 manufacturers of closures, more than 500 brewers, 6300 bottlers, 1100 wineries and 250 distillers will be affected.

Use of Certain Organic Binders For Steel Containers Limited

Coatings containing certain organic binders or pigments may not be used for coating steel containers of two gallons or greater capacity after June 20, by the terms of General Conservation Order M-158, announced by WPB.

Order is expected to save nearly a million pounds a year of critical oils and resins, which are needed for military purposes. Normally, about 1,600,000 pounds each of critical oils and resins are used for drum coating each year.

The order divides coatings into two classes: "Class A," and others. Class A coatings, containing tung, oiticica, perilla or dehydrated castor oils; alkyd, phenolic, vinyl, urea or melamine resin; or cellulose esters or ethers, may not be used for drum coating after June 20 except for export (other than Class A coatings containing tung or oiticica), or orders for the Army, Navy, Coast Guard or Maritime Commission.

The order further provides that after June 20 no person shall apply any coating other than black, except for small areas of color required for marking or legal requirements.

Users of container coatings are forbidden to accept, after June 7, delivery of any Class A coatings, or any colored coating (except black, grey, and white) except for offshore shipment or export, or for the Army, Navy, Coast Guard, or Maritime Commission.

Four Leading Industrialists To Advise Army Ordnance Chief

Four of the nation's prominent business leaders will serve as a voluntary advisory staff to Maj. Gen. Levin H. Campbell Jr., new chief of the Army Ordnance Department.

They are: K. T. Keller, president, Chrysler Corp., Detroit; Bernard M. Baruch, head of War Industries Board in the World War; Benjamin F. Fairless, president, United States Steel Corp., and Lewis H. Brown, president, the Johns-Manville Corp., New York.

George C. Heikes, mining engineer and geologist formerly associated with the National Lead Co., has been appointed chief of the WPB Zinc Branch. Mr. Heikes has been assistant chief of the branch. He succeeds David Uebelacker, who has been recalled by his company, Ford, Bacon & Davis, New York.

John W. Small, Hendersonville, N. C., has been named associate director of the ODT's Division of Railway Transport, in charge of mechanical operations. Prior to his retirement in 1930 he was chief mechanical officer of the Chesapeake & Ohio.

Harold J. Drescher, New York attorney, has been appointed executive assistant to John R. Turney, director of the ODT Division of Transport Conservation. Charles L. Dearing, Washington, a member of the staff of Brookings Institution, will be a consultant in the division.

J. P. Imlay, Jacksonville, Fla., was named supervisor of port conditions at Jacksonville for the Division of Railway Transport. He will work with railroad and ship terminal authorities to expedite use of those facilities.

New Priority Regulation To Bring 10,000 Metal Consumers Under PRP

WASHINGTON

ANOTHER step toward strict allocation of scarce materials and improved control of inventories has been taken in an announcement by J. S. Knowlson, Director of Industry Operations, that all but a few classes of companies requiring more than $5000 worth of metal for the third quarter of 1942 must apply for priority assistance under the Production Requirements Plan before July 1.

More than 10,000 companies, including most of those handling large war contracts, will be required to operate under PRP by the terms of a revision of Priorities Regulation No. 3. About 7000 companies are now using the plan.

Preference ratings are assigned under the PRP only for specified quantities of materials to be obtained during a calendar quarter. Major metal using plants affected by the revised regulation will not be permitted to use any preference rating except ratings assigned to them by the plan during the third quarter of 1942. In that quarter they will not be allowed to accept delivery of any scarce metal in excess of a quota established for them.

It is anticipated that only the following classes of companies which will use more than $5000 worth of metal in the third quarter will continue under existing procedures instead of the PRP: Producers engaged in primary production of basic metals; distributors; wholesalers; builders; companies engaged in transportation; utilities, including light, heat, water and gas companies; mining companies and petroleum enterprises; communications, including telephone and telegraph; companies engaged in sewage and drainage operations.

All large metal users have recently been required to report their use of metal to the WPB on Form PD-275. Those affected by the revision of Priorities Regulation No. 3 may use exactly the same information in filling out PRP application Form PD-25A, adding the other information called for.

As a result of this step, the WPB will be able to determine in advance of each quarter the total quantities of material required by industry. It will also obtain information as to available inventories in the hands of each manufacturer. With this information at hand, demand can be brought into approximate equality with supply, and the available supply will then be distributed in accordance with the established quotas.

While preference ratings will be assigned under the PRP, the WPB will assign ratings only to delivery of the amount of material which it is estimated will be available during the quarter.

Tin Can Salvage Programs To Be Launched in 36 Communities

WASHINGTON

A TIN can salvage program to reclaim large quantities of tin, steel scrap, and copper urgently needed for war materials will be sponsored and directed by the WPB Bureau of Industrial Conservation.

Plans for tin can collection in 36 metropolitan areas, advantageously located for rail shipping to detinning and copper precipitation plants now in operation, have been announced by the bureau.

Collections will be restricted to these areas at present because authorities estimate it will take only 250,000 tons of tin cans a year to keep existing detinning facilities running at maximum capacity.

In 32 areas, householders will be asked to prepare the cans by cleaning, removing the label and both ends, and compressing slightly for shipment to detinning plants.

In four designated centers, Los Angeles, Dallas, Houston, and Kansas City, Kans., and Kansas City, Mo., unprepared cans will be collected for shredding and delivery to copper mines where they are used in the process of reclaiming copper through precipitation.

"Because of transportation difficulties," said Lessing J. Rosenwald, chief of the Bureau of Industrial Conservation, "householders in the country at large cannot be assured that tin cans they may collect can be disposed of unless they reside in one of the selected cities in which tin can campaigns are to be launched."

The metropolitan centers selected to collect tin cans for detinning plants and to be asked to inaugurate collection programs are: Boston, Hartford-New Britain, Conn.; Providence, R. I.; Springfield, Holyoke, Mass.; Lowell-Lawrence, Mass.; New York; Northern New Jersey; Albany - Schenectady - Troy, N. Y.; Philadelphia; Scranton-Wilkes-Barre, Pa.; Baltimore; Washington; Rochester, N. Y.; Buffalo; Pittsburgh; Youngstown, O.; Cleveland; Detroit; Columbus, O.; Cincinnati Louisville, Ky.; Indianapolis; Chicago; Milwaukee; Minneapolis-St. Paul; St. Louis; Denver; Atlanta, Ga.; Birmingham, Ala.; New Orleans; San Francisco; Seattle; Portland, Oreg.

Three Government Aluminum Plants Completed in May

Three new government-owned aluminum plants started operations in May, a fourth is expected to begin production early in June and the entire first expansion program of seven plants will be in production by Aug. 1, A. H. Bunker, chief, Aluminum and Magnesium Branch, announced.

All seven plants will be completed ahead of schedule, he said. The first two were finished in six months as compared to a normal building time of eleven months. The plants will get into full production from 60 to 120 days after completion, depending upon size.

The completed plants are located in Oregon, Washington and New York. The Alabama plant will be completed next, followed by ones in Arkansas, California and a second plant in Washington, in that order. All were built for the government by the Aluminum Co. of America, which will operate them.

Plants in the second expansion program, also of 640 million pounds annual capacity, will start coming in about December of this year. The flow of aluminum metal is expected to increase every month from now on until the early part of 1943 when the entire aluminum capacity as planned by WPB will be operating at its peak.

Manufacture of Most Musical Instruments To Be Prohibited

Manufacture of practically all musical instruments will be stopped soon by WPB.

Present stocks of 27 different kinds of band instruments will be frozen in the hands of manufacturers, jobbers and wholesalers. These frozen stocks will be made available to the armed forces for use by Army, Navy and Marine bands.

The stop provision applies to instruments containing more than 10 per cent, by weight, of critical materials. Critical materials include not only metals but also cork, plastics and rubber. The order therefore affects almost all musical instruments except violins, cellos and some guitars.

WPB Adopts Uniform Policy for Appeals from Limitation Orders

WASHINGTON

A UNIFORM policy to be followed in the consideration of all appeals for permission to continue production which has been halted by WPB conservation and limitation orders has been announced by the WPB.

Policy adopted will govern decisions on appeals to assemble processed or semi-processed inventories beyond cut-off dates or in excess of limitation quotas. In general, such appeals will not be granted except when the materials involved have already been fabricated to such an extent that their use as scrap would be grossly wasteful.

WPB has issued more than two hundred conservation and limitation orders restricting or stopping production of hundreds of different articles.

Granting of appeals will be considered only after it has been determined that no other adequate relief is available to the applicant. Relief available in many cases without granting an appeal from the terms of a WPB order includes:

1. Assistance in disposing of frozen inventory materials to other companies permitted to use them, or to government agencies;
2. Re-sale to the source of supply;
3. Assistance in obtaining war orders or in conversion of facilities to direct war production;
4. Advice on obtaining financial assistance from the Bureau of Finance in the Division of Industry Operations;
5. Assistance in the disposal of idle production equipment.

Before filing an appeal under an order, any company which considers itself subjected to undue hardship should consult with the nearest WPB field office to find out whether any of the forms of assistance outlined above will solve its difficulties.

When an appeal is filed in proper form for permission to assemble processed inventories in excess of limitation or conservation orders, no such appeal will be granted unless:

1. The amount of unprocessed critical material is exceptionally small.
2. The following tests are met:

A. The processed inventory must be without salvage or reclaim value to war production, and, if not assembled, must have small scrap value, compared to the worth of the completed item.

B. The appellant must not be in violation of existing conservation, limitation, or priority orders.

C. The appellant must not have purposely processed a large inventory with the view of requesting preferential treatment or have otherwise violated the spirit of the order from whose terms he is appealing.

D. The labor to be employed for the assembling of the inventory will thus be trained for war work, or if this is not the case, the labor so used for assembly should not be required immediately for war production.

E. Consideration will be given if granting the appeal will help finance conversion to war work, or if this is not the case, will relieve the appellant's financial stress, and in no way interfere with the war effort.

F. Granting the appeal must not give the appellant any substantial advantage over competitors in a like situation.

G. No permission will be granted to use or procure materials which are very scarce, such as nickel and tungsten, except when the amount is extraordinarily small and the article manufactured will have an unusually large value to the national economy.

Primarily, appeals will be granted only if the successful prosecution of the war is furthered thereby. However, there may be certain appeals for relief where to deny the appeal would injure civilian economy without corresponding benefit to the war effort. In those instances the tests above will be treated as the basic points to be taken into consideration in determining whether or not to grant the appeal.

Army's New Tankbuster Excels in Speed

ONE of the United States' newest war weapons is this armored tankbuster mounting an armor-piercing antitank gun, now being tested at Fort Custer, Michigan. On a half-track, it is considerably faster than the speediest tank. NEA photo

Beryllium Placed Under Complete Allocation Control

Complete allocation control over beryllium, alloying material used to harden copper, has been ordered by WPB with the issuance of Order M-160.

Consumers must file requests for allocation on Form PD-496 by the twentieth of the month preceding the month in which they wish delivery and must file a monthly report to the WPB on Form PD-497. The latter form also must be used by any person who has as much as 10 pounds of beryllium in his possession in any month for a report to WPB.

Until July 1, beryllium may be delivered without allocation to produce an article with a rating of A-1-c or higher.

Principal uses of beryllium are to produce non-sparking cutting tools and hardened copper parts in airplane instruments. The bulk of the United States' supply has been received from the Latin-American countries.

BIG NEWS IN THE 90'S

BIGGER NEWS TODAY!

HYATTS CERTAINLY HELPED TO MAKE IT THAT WAY!

FROM "HORSELESS AGE" MAY 1896

The Hyatt Roller Bearing

Some years ago John W. Hyatt, the well-known inventor in the celluloid line, undertook an exhaustive series of experiments with the object of producing a practical roller bearing. The result of these experiments was the Hyatt Roller Bearing, which from the time it was first placed on the market has been steadily gaining in favor as its merits as a friction saver become known.

The peculiar feature of the Hyatt bearing is that the rollers are both flexible and elastic, which contributes greatly to its durability and decreases the friction of the bearing. When under a load the pressure is automatically distributed over a number of rollers. On this account it is not necessary to harden the rollers and the surfaces with which they come in contact, as is the case when solid rollers are used.

Wherever thoroughly tested these rollers have fully borne out the claims of the manufacturers. They are being successfully employed in shafting of all kinds, street cars, bicycles, wagons and high speed machinery of all kinds.

Quite a number of motor inventors have adopted them for axle bearings, finding friction greatly reduced.

The Hyatt Roller Bearing Company have a factory in Newark, N. J., at 450 Market Street, and a New York office at 133 Liberty Street, where they will be pleased to see those in search of further information.

BUT HOW THESE BEARINGS HAVE IMPROVED IN DESIGN AND CAPACITY OVER 50 YEARS! WHAT A PRECISION BEARING HYATT IS TODAY!

...AND NOW, YOU'LL FIND HYATTS IN CADILLACS, BUICKS, CHEVROLETS, ETC., AS WELL AS IN FARM MACHINERY, INDUSTRIAL APPLICATIONS, AND IN TODAY'S MIGHTY FIGHTING EQUIPMENT.

THIS OFFER STILL GOES! DROP IN... OR DROP A LINE ANY TIME TO...HYATT BEARINGS DIVISION, GENERAL MOTORS CORPORATION, HARRISON, NEW JERSEY, WHERE FACTORY AND OFFICES ARE NOW LOCATED.

THE 50TH YEAR OF

HYATT ROLLER BEARINGS

1892-1942

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Automobile industry shoulders war production load of 14 billions, three times normal annual output in peacetime . . . Examples of speed and cost reduction are typical of mass production genius

DETROIT

SIX MONTHS ago Sunday morning death rained out of the skies at Pearl Harbor, Hawaii, and the U. S. was in the war. It is appropriate at the end of this half-year period to take stock of what has been accomplished in the gearing of industry for a total war effort.

On Dec. 7, the automotive industry's share in the defense program was an accumulation of war orders totaling roughly four billions of dollars. By the term "automotive industry" is meant passenger car and truck builders, as well as all the leading body builders and parts suppliers. In the first five weeks after Dec. 7 contracts for 3½ billions of military supplies were dumped into automotive plants, equal to the total of all defense contracts given the industry in the two years after the Nazi invasion of Poland.

Succeeding weeks found the total growing until the industry's accumulated orders exceeded 14 billions of dollars—representing a production job calling for materials, men, plants and equipment sufficient to produce 15,000,000 cars and trucks, normally a three-year job. The auto industry was asked to build 75 per cent of all aircraft engines, over one-third of the machine guns, more than two-fifths of the tanks and tank parts, more than half the diesel engines, 100 per cent of the motorized equipment and many other items on the military bill of materiel.

The job is being done, beyond what anyone ever anticipated. Deliveries of armaments in the six months just ended are estimated by the chiefs around the campfire of the industry's council for war production at upward of $1,400,000,000 —equal to one and a half times the value of all armaments shipped by the industry from the start of the war in September, 1939, to Dec. 7, 1941.

How the tempo of shipments has increased can be appreciated by noting orders shipped through the Detroit District Ordnance office which keeps tab on Army production in Michigan plants. In January, 1941, the number of orders shipped through this office totaled 29. By January, 1942, Army orders totaled 1402, and in April, that total climbed to 1850. Watching the rate jump to 2200 in May, ordnance officers freely predicted that "the current rate of shipments will be doubled or tripled in June and July."

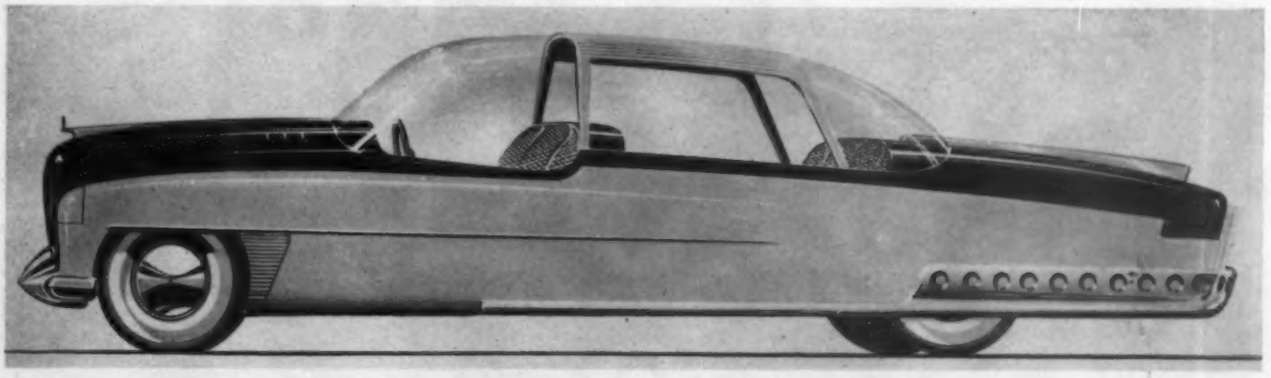
Same Story, Everywhere

Looking into specific cases of production achievements as far as the censor's unpredictable pencil will permit, the story is just about the same everywhere. For example, a passenger car builder was awarded its first contract for anti-aircraft guns early in 1941, and the first unit was completed 180 days later. Straight-line production was under way in another 30 days and within a year shipments were running ahead of original contractual requirements by 1000 per cent. Deliveries now are at a rate exceeding by 30 times the schedule originally planned.

A peacetime producer of shock absorbers, bumpers and miscellaneous parts began machine gun manufacture over a year ago, five months after receiving a contract and two months ahead of schedule. Since December the size of its original order has been increased eight times and scheduled peak production for the existing plant has been doubled. Employment on the job has increased 50 per cent in six months and will be jumped another 50 per cent by midsummer.

One of the first of the automotive companies to enter shell production turned to an automotive technique—the upset-forge process instead of the traditional pierce-and-draw method. After tooling up to produce 1,000,000 large-caliber shells, the company was able to turn out its second million shells in 55 days and its third million in 35 days. Subsequently additional days have been clipped from schedules.

A parts company developed equipment which turns out 20 to 30 times as many machine gun components as regular arsenal machinery operating alongside can handle. The same company, working with ordnance and steel company tech-



HERE is one design for a postwar car, conceived by industrial designer Raymond Loewy, New York, who in recent years has been active in development of designs for Studebaker and numerous companies outside the automotive field.

In this concept, a small motor, possibly of the pancake type, would be mounted front, rear or center. Top is transparent plastic, with metal center support. Faired-in undercarriage and long overhang at the rear are other innovations. Mr. Loewy says: "Designers should be working now on production plans for the postwar period. Conversion may take up to a year after hostilities cease; then we must be prepared to turn out a better product and to do it in half the time we used to take"

nicians, perfected a specially designed shape of high alloy steel from which to process barrels. The forged shapes, weighing 47 pounds each, replace 65-pound steel billets formerly used.

Something has been said in these columns before about cost reductions which have been the result of mass production of war products by accepted American techniques. A specific case in point is an automatic cannon placed in production 18 months ago and costing then around $1200. Within six months better than $250 had been pared off this figure, while today's price to the government is nearly 40 per cent lower, or around $750.

First placed in experimental production in 1939, one essential unit for the Navy cost about $30,000. When placed on a regular production basis the price was cut 9 per cent by the passenger car builder handling the job. As volume of orders and output increased five further successive reductions were made in the price which is now 37 per cent below that of the experimental unit.

So, the war on the production front has progressed amazingly in six months. All American industry —not alone automotive—can take a full measure of credit for this achievement. Not so much can be said for the movement of finished products to battlefronts. Problems of transportation, shipping and logistics (determining where, what and how much material and supplies shall be dispatched) do not appear so readily solvable. A suggestion might be to call in some of industry's experts to assist in diagramming offensives. Certainly military minds *per se* offer no guarantee of the correct answers, tradition notwithstanding.

Chrysler's New Plant

Great things are being talked for the new Chrysler plant in the Chicago area, which according to previously published information will be turning out radial engines of the Wright type some time next year. A new type of plant design for one-story reinforced concrete construction has been worked out by Chrysler engineers and the collaborating architect, Albert Kahn, for the structure, it is said, will house the largest plant area under one roof ever built. This distinction hitherto has been held by the Ford Willow Run bomber plant, but is now being challenged not only by the new Chrysler plant but also by a new General Motors bomber plant, ground for which has been broken.

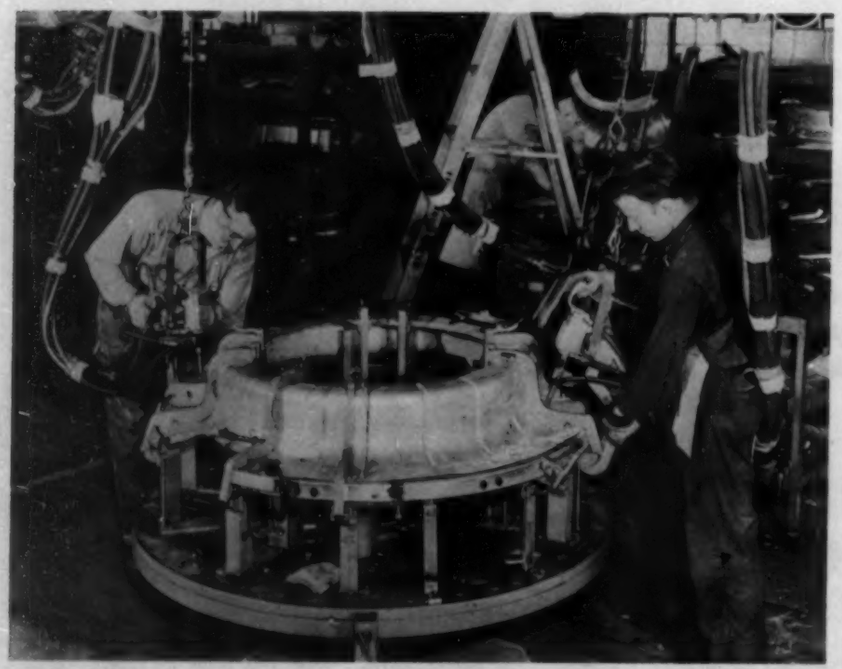
Instead of the 5 to 12 pounds of steel per square foot of floor area required by conventional steel or reinforced concrete designs, the new Chrysler plant calls for only 2.7 pounds per square foot. Saving on steel alone in the design is claimed to be sufficient to build 14 destroyers or six 10,000-ton cargo ships or "an undisclosed number of unknown tanks of an unstated tonnage."

Saving is accomplished principally by a new type of overhead arch-rib construction which economizes on reinforcing steel and at the same time provides spaciousness for the building itself and overhead beams for ready attachment of monorails, trolleys, hoists, pipelines, etc. Further saving is effected by use of a new type of Kahn-developed window sash entirely of wood and glass and called "victory sash." Designers also saved 125 tons of steel in a four-mile fence enclosure by substituting high wood pickets for chain-link steel wire. The four-mile fence suggests the plant site is one mile square or thereabouts.

Indications point to a serious shortage looming ahead in replacement parts for automobiles. Parts inventories are far out of balance and there are actual shortages in some areas, which will be aggravated as the Army calls on civilian facilities to handle repair and maintenance work on military vehicles.

Early estimates of a prospective labor shortage in the Detroit metropolitan area are being tempered by as much as 25 to 30 per cent, principally as a result of important reductions in man-hours possible as new war products are fitted into the most efficient production technique.

Employment here is at a new high level, around 532,000, and is moving up, bolstered by steady inmovement of skilled labor, mainly from outstate points. Maximum employment estimates started at about 1,200,000, then were scaled down to a million, then to 840,000, and another reduction of one-third now is being talked.



DEVELOPMENT of special jigs and use of portable spot welding guns has so speeded up production of these aluminum cowling members for Flying Fortresses in a plant of Fisher Body Division that they are being shipped in carload lots, along with exhaust manifolds and other fixed and removable cowlings

New Ohio Plant To Build Liquid-Cooled Engines

Construction of a plant to build a new liquid-cooled airplane engine with horsepower rating considerably greater than that of any other liquid-cooled engine now in production for aircraft has been announced by William F. Wise, executive vice president of Aviation Corp. The engine will be built by Liquid Cooled Engine, a new division of Aviation Corp., for the United States Navy, marking the first use of liquid-cooled engines by the Navy in this war. The Army Air Forces make extensive use of Allison and Packard Rolls-Royce liquid-cooled engines.

Development work on the new design, started several years ago, was done for and with the co-operation of the Navy at Lycoming Engine Division of Aviation Corp., in Williamsport, Pa. Construction of the new plant, in Ohio, started last week. The announcement ties in with earlier published reports of a new $7,200,000 aircraft engine plant to be built at Toledo.

FROM FACTORY TO FIRING LINE

In Less Time with ATKINS

New Segmental Cold Saw Unsurpassed for High Speed Shell Stock Cut-Off!

● Here's a typical example of how Atkins Saws are coming through with unprecedented production on vital armament jobs. A 28-inch Atkins Curled-Chip Segmental Cold Saw is reported as cutting 3-5/16" round shell stock, nested, in 4 minutes! If your plant is engaged in shell manufacturing, you will want full data at once on the production-boosting potentialities of Atkins Curled-Chip Saws.

The illustration at the right shows a section of an Atkins Cold Saw with teeth replaceable in segments. It also shows the characteristic shape of the Atkins Curled-Chip Tooth — a new tooth form that has revolutionized metal sawing. This tooth bites into metal like a lathe-cutting tool, removing metal in curled-chips, permitting enormous increases in cutting rates.

An Atkins engineer will gladly go over your cutting problems with you, and recommend a saw that will handle your work faster and with greater efficiency than you may have thought possible.

E. C. ATKINS AND COMPANY
Indianapolis, Indiana

Photo by U. S. Army Signal Corps

WING TIPS

Kindelberger criticism of automobile methods in aircraft production raises storm . . . Rentschler softens blow . . . More licenses for Pratt & Whitney engines . . . Seversky points way to air victory

JAMES HOWARD KINDELBERGER, president of North American Aviation Inc., and one of the more aggressive leaders of the airplane manufacturing industry, really started the wolves howling when he told newsmen recently that the automotive industry had not delivered a single aircraft part after 16 months of preparation, and that the "aircraft production program will cost twice as much and take twice as long as would have been the case if the whole thing had been left to the aircraft industry."

Angry retorts of, "'Tain't so; 'tain't so" greeted the biting observations—but the damage was done.

Probably what Kindelberger had in mind was not so much lack of deliveries from the automobile plants, for after all, not so long ago shipments of bomber parts to one of his own plants got so far ahead of schedule that stop orders were issued to the automobile body company making them, but rather the delay occasioned by adapting automotive manufacturing methods to the production of aircraft parts. Specifically, he referred to one automobile company wasting and spending $4000 in making tools that the aircraft industry would make in much less time for $40.

There is something to this viewpoint, and only time will tell whether tooling up presses with alloy iron dies made by conventional reproduction methods has any advantages over pouring up some Kirksite dies in plaster molds, which can be done in a fraction of the time. There is some food for thought in Kindelberger's points that the "airplane must remain fluid. It has not been possible to freeze designs for any length of time. There is no point in spending weeks to make expensive tools for aircraft manufacture that may have to be thrown away next day."

Designs Must Be Frozen

But if you are going to get true mass production as the auto industry understands it, there has to be some design freezing somewhere. The case of the Ford Willow Run plant is an example. Here tooling is well along for building one of these huge bombers every hour, day in and day out. But each one will be the same as its predecessor and even a minor change in design probably would call for closing down the plant for retooling.

So you can put it down in the book that Kindelberger is nobody's fool. In the eight years since E. R. Breech grabbed him from his post as chief engineer at Douglas to become president of NAA at Inglewood, Calif., he has seen the aircraft industry grow from a struggling infant to a giant in the military picture. His own plants have mushroomed steadily and now include units at Dallas, Texas, and Kansas City, Kans.

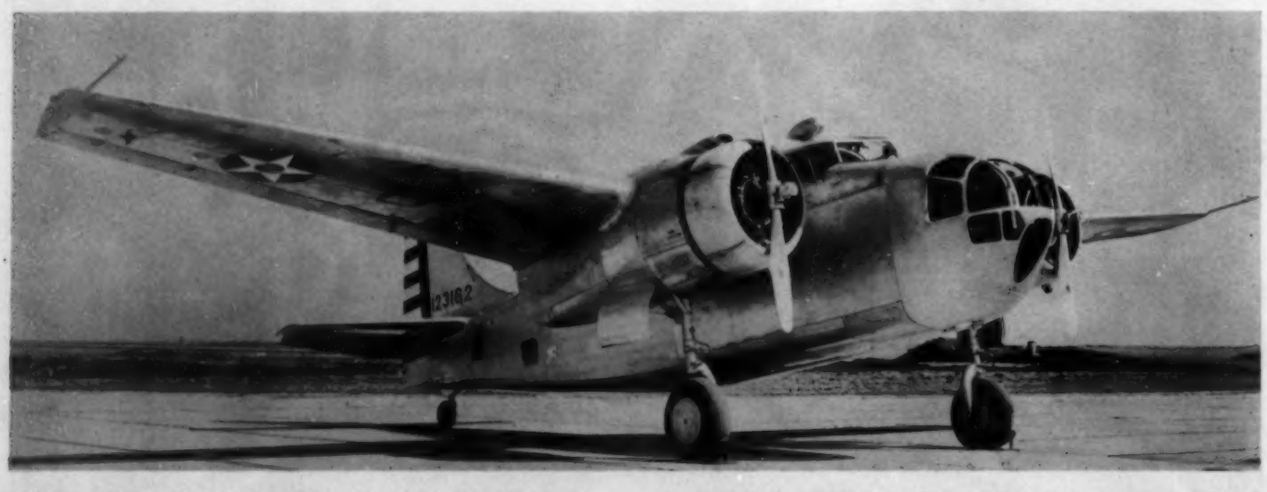
"Dutch" likes the unorthodox way of doing things, which may partially explain his recent pungent comment about the auto industry's part in aircraft production. He is credited with introducing many innovations in manufacturing technique such as turning the two halves of a training ship fuselage inside out as they rolled down a conveyor line, to give workmen easy access for installation of the "spaghetti and plumbing" and other vital organs.

Recently he took pen in hand and through the pages of his plant newspapers addressed his employes as follows:

"Chained to a desk piled high with papers, and with the increasing demand for almost continuous travel, I do not have as much time as I should like to get acquainted with all of you and to find out what you are thinking and why.

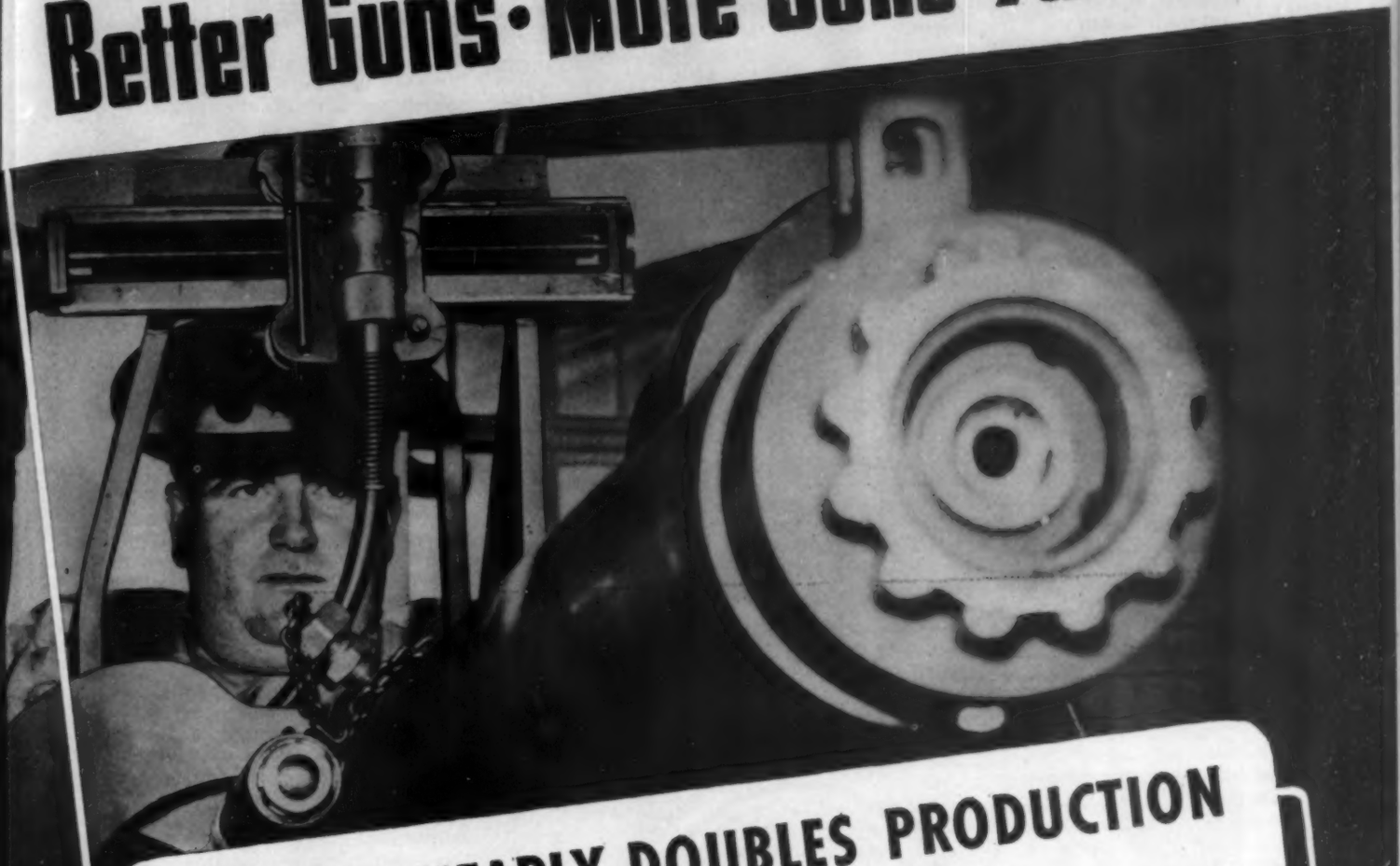
"The Inglewood old-timers will tell you they didn't hesitate to hand me a hot complaint when they thought I had it coming. What's more, I was usually able to do something about it in a way that made most people think that North American was a pretty decent place to work. The war has changed my daily schedule and has given us far too many employes for me to greet every one by his first name.

"In spite of that, I still want to



BOEING AT-15 CREW TRAINER: First training plane specifically designed and equipped for integrated tactical training of pilots, co-pilots, bombardiers, navigators and gun crews. Making the next step up from single engine basic training planes, AT-15 is in reality a small bomber, complete even to bomb racks, power-operated gun turret, regulation bombardier's position in the plastic-enclosed nose, and full radio navigational installations. The plane is constructed largely of non-strategic materials. In place of aluminum alloy or stainless steel there is wood, with some steel tubing in the internal structure. Wing span is about 59 feet; length 42 feet. It is powered by two Pratt & Whitney engines

Better Guns · More Guns · *Faster!*



SUNICUT NEARLY DOUBLES PRODUCTION

Increases Tool Life 60%

Guns and more guns is the aim of America today — produce better guns . . . more guns . . . faster! That's exactly what one munitions manufacturer achieved when he called in a Sun Oil Engineer . . . one of those Doctors of Industry.

A change was made to Sunicut, the free-flowing, transparent sulphurized cutting oil, on machines producing parts for anti-aircraft guns. The improvement was noticeable almost immediately. Tool life increased 60% . . . finish was improved . . . and the output of vitally needed parts boosted from 2½ pieces per eight hour shift to almost 4½ . . . nearly doubling production.

That's another typical example of how Sunicut and Sun Oil Engineers are helping America step up production for victory!

Throughout the war industries . . . wherever metal cutting problems arise . . . Sun's Doctors of Industry and this extraordinary cutting oil stand ready, willing and able to help. Call on them to improve production in your plant. For helpful case histories of what they have accomplished in other leading metal working plants, write for your free copy of "Helping Industry Help America."

SUN OIL COMPANY • PHILADELPHIA

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUNOCO

SUN PETROLEUM PRODUCTS.. HELPING INDUSTRY HELP AMERICA

know what you think, the bad things as well as the good. Please take a few minutes when you get home tonight, check your answers (on an attached questionnaire) and drop this sheet in the box at the gate when you come in tomorrow. If you want to call me a few names, let your conscience be your guide—there is plenty of room in the 'gripe corner'. If you prefer, use the gripe corner for your own pet ideas for improving our show, the sort of ideas that don't fall into the regular suggestion plan. Just let down your hair and tell me the first thing you would do if you were in my shoes.

"Incidentally I have a bet that I will get most of these questionnaires back—answered. Don't let me down. If you like the idea of having this sort of chance to register your opinion let me know and we'll have more such questionnaires later."

The questionnaires dealt with such things as general plant spirit, feeling of employes for both the company and the product, and preferences for such things as lunch wagons, music during lunch periods, plant papers and magazines, home talent shows during lunch periods, etc. Mr. Kindelberger apparently lost his bet as returned questionnaires were under 2000 in the Texas plant, but this is still a good showing. Roughly 35 per cent had no "gripes"; the rest were relatively minor complaints. A surprising trend was the voting against lunch carts which are operated in the plant, nearly half of those replying voicing their disfavor.

The personal touch, whether inspired by Mr. Kindelberger himself or by the able staff of public relations experts with the company, is still a good morale builder, and the end result can only be more and better airplanes.

Employe Suggestions Win

Twenty-six hundred employes submitted production improvement ideas in three NAA plants, 139 awards being made in a $10,000 prize suggestion contest. First prize winner at Inglewood, Andrew Brown (not Andrew H.), submitted an idea for forming tubing in a compound set of forming blocks, built to the exact shape of the finished tube. The operation results in eliminating setup time and trimming, permits application of fittings and banding, and allows all flaring, swaging and degreasing to be done before bending.

First winner at Dallas, James R. Hinds, submitted a ball bearing grease exchanging procedure which will permit regreasing more than 1,000,000 ball bearings in far less time than previously required. Army Air Forces requested regreasing of the ball bearings and in order to do this it is necessary to remove the grease already packed in the bearings, regrease, code mark, clean and pack. By Hinds' scheme, bearings can be regreased at a rate of 100 a minute, the balls being placed in an inclined rack and passed between two rows of three air jets which clean off excess grease. At the end of the runway, packing tubes are pre-positioned, in which the bearings are stacked and transferred to storage. The method permits four women to clean and pack 55,000 bearings in 8 hours' time.

Winner at Kansas City, Paul M. Burcham, conceived a plan for reducing the time formerly required to manufacture ammunition magazine reinforcements. Previously requiring a forming fixture used on a hand brake, including a trimming operation afterward on each part, the straps are cut to exact length and formed in one operation on the new fixture, a procedure which saves time and motion in the actual forming process, and also eliminates setup time.

Possibly conceived to soften Mr. Kindelberger's sock at the automotive industry was the statement released recently by F. B. Rentschler, chairman of United Aircraft Corp., Hartford, Conn., who pointed out that much credit for speeding production of both engines and frames would be given to the automobile industry, adding that production soon would be greater than the airplane industry could have hoped to accomplish in the same period.

"We were keen about the automotive men coming in," declared Rentschler. "We needed them and the government needed them." But he added a note of caution, foreseeing the danger that the automobile industry might force smaller airplane manufacturers out of business in the postwar period.

Licensing of other manufacturers to build Pratt & Whitney radial engines is on a nonprofit basis of $1 per unit, Rentschler explained, mentioning that Ford, Buick, Chevrolet, Nash-Kelvinator, Jacobs and Continental are all producing under this arrangement. Other United Aircraft products being built under license include Hamilton-Standard propellers, by Nash - Kelvinator, Frigidaire and Remington-Rand; and Vought-Sikorsky planes, by Nash - Kelvinator, Brewster and Goodyear.

These industries, combined, will

INBOARD wing and nacelle units, with retractable wheel and gear, for installation in two-motor attack bombers, travel down an overhead assembly line at plant of Murray Corp. of America, former producer of automobile bodies which is now turning out production quantities of wing and fuselage parts

More Ideas for Increasing War Production

LABOR-MANAGEMENT committees have been formed in 800 war production plants, according to WPB. As committees are organized, ideas for spurring output are formulated.

To impress upon employes that the lives of fellow workers in the armed forces depend upon them, the transmitter and tube division of General Electric Co.'s television and electronics department has erected a large poster board (at left). Displayed are photographs of fellow workers in the services.

Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., has a scoreboard to record progress in an idea contest. As ideas are accepted, a cut-out figure of workmen carrying acetylene torch (center) progresses up a 15-foot ladder. Relative standings of departments are shown on board attached to ladder.

"Production boards" have been developed by the committee at Lewis Foundry Machine Division, Blaw-Knox Co., Groveton, Pa. Boards (below) are mechanized, making it possible to move the caricatures in keeping with production results.

ROLL TURNING & GRINDING
LET'S PUT HITLER THROUGH THE WRINGER !!
PERCENTAGE OF ROLLS CAST TO DATE
YOU DAMN YANKS HAVE CAST Paulo ROLLS THIS WEEK
QUOTA PER WEEK 100% PRODUCTION

produce several billion dollars worth of products annually. Engine production alone now is 15 times that of two years ago, in terms of horsepower. United Aircraft is expanding its own production of P&W engines with a new plant at Kansas City, Mo.

Any student of military aviation and its relation to the present war, engineer or layman, should get a copy of Major de Seversky's new book *Victory Through Air Power*, published by Simon & Schuster, New York. A designer of aircraft, experienced pilot and keen analyst of military operations, De Seversky shows in detail how air power has won all crucial battles to date, how naval forces have been relegated to inferiority in the face of hostile aircraft, how ship-based aircraft suffer because of confined and vulnerable landing space, and how some of our own leading military minds still refuse to accede to the dominance of air power. He points to some apparent glaring deficiencies in combat craft this country is producing, observations which should prove distinctly unsettling to those who have believed in the unquestioned superiority of U. S. air power.

Many of the deficiencies are well on the road to being corrected, but the veil of military censorship either has kept these developments from the author's knowledge, or else he has seen fit to keep them to himself. Certainly some of his caustic remarks about the Army's adherence to the liquid-cooled engine as one of its "pets" do not seem entirely called for, but few can dispute the soundness of his argument concerning the folly of having two separate air arms in the fighting forces, one serving the navy and one the army.

MEN of INDUSTRY

H. N. Arbuthnot

E. T. Barron

C. F. W. Rys

W. H. Henry

H. N. ARBUTHNOT has been appointed assistant general sales manager, Allegheny Ludlum Steel Corp., Pittsburgh. He joined the company in 1926 as Detroit district manager for the former Allegheny Steel Co., holding that position through the merger with Ludlum Steel Co. in 1938. Prior to his association with Allegheny he was identified with American Sheet & Tin Plate Co., Weirton Steel Co. and Follansbee Bros. Co.

♦

La Monte Daniels, Toledo, O., branch manager, International Harvester Co., has retired.

♦

Harlan B. Collins, company counsel, Cleveland Pneumatic Tool Co., Cleveland, has been elected assistant secretary.

♦

Charles H. McCrea has been elected first vice president and a director, National Malleable & Steel Castings Co., Cleveland.

♦

William P. Gwinn, the past two and one half years assistant sales manager, Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn., has been promoted to assistant general manager.

♦

W. P. Woodside, for 18 years president, American Twist Drill Co., Detroit, has retired from this position to become chairman of the board, being succeeded in the presidency by **W. F. Murray,** long associated with the company. Mr. Woodside, a founder member of the American Society for Metals, is also vice president in charge of research for Climax Molybdenum Co.

♦

Edward T. Barron, the past seven years manager of the Metallurgical Division, Pittsburgh district, Carnegie-Illinois Steel Corp., has been promoted to chief metallurgical engineer, succeeding **C. F. W. Rys,** who has been made chief consulting metallurgist under the vice president in charge of operations.

Richard W. Simon has been appointed manager of the metallurgical division, succeeding Mr. Barron. The past three years he has been assistant manager of that division.

♦

Allan McKay, formerly associated with Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has been appointed general manager, Kaukauna Machine Corp., Kaukauna, Wis., succeeding **W. H. Roloff,** resigned.

♦

L. F. Niemann has been named district manager of the St. Louis warehouse of Scully Steel Products Co., and **J. K. Rittenhouse** has been made district manager of the company's Twin City warehouse at St. Paul, Minn.

♦

Gerald F. Coons has been named manager of sales, New Orleans office of National Tube Co., Pittsburgh, succeeding **Harry L. Bialock,** who recently became associated with Tubular Products Inc., Gary, Ind. Both companies are subsidiaries of United States Steel Corp.

♦

C. W. Spittal and **W. R. Breeler** have been appointed general manager and assistant general manager, respectively, at the Dunkirk, N. Y., plants of Allegheny Ludlum Steel Corp. **C. Cottrell** has been named production manager of the Howard avenue plant, Dunkirk, while **Merle Graham** will be production manager of the Brigham road plant. **W. H. Norris** has been named manager, Watervliet, N. Y., plant, with **J. Q. A. Doolittle** as assistant manager and **G. Anderson** as production manager.

♦

C. F. Pittman, manager, motor division, industrial department, General Electric Co., Schenectady, N. Y., has been made assistant to the manager of the industrial department. **W. H. Henry,** formerly manager of sales, motor division, succeeds Mr. Pittman as manager of that division.

♦

Alfred Sontag has joined the testing machine department, Baldwin Southwark Division, Baldwin Locomotive Works, Philadelphia. He formerly was chief engineer and sales manager, Riehle Testing Machine Division, American Machine & Metals Inc., East Moline, Ill.

♦

Robert C. Wilkin, heretofore sales manager of building wires for the Habirshaw Cable & Wire Division of Phelps Dodge Copper Products Corp., New York, has been appointed Pacific Coast manager, with headquarters in Los Angeles.

♦

H. V. Jamison, of the advertising division of Carnegie-Illinois Steel Corp., Pittsburgh, retired June 1, following an illness of some months. Having had 38 years of active service with subsidiaries of United States Steel Corp., he was the senior advertising official in the entire Steel corporation organization. He first joined American Sheet & Tin Plate Co., serving as advertising manager many years. In 1936, when that company was consolidated with Carnegie-Illinois,

Mr. Jamison became associated with the larger company, remaining active until his illness. He was at one time, president, Pittsburgh Advertising Club, and also served as a director, Association of National Advertisers and National Industrial Advertisers Association.

♦

Maxwell Kennedy has been appointed marine sales manager, merchant marine division, Westinghouse Electric & Mfg. Co., Philadelphia. He has been transferred to his new post from the company's office in Washington where he was attached to the marine section.

♦

Robert E. Lewis has been elected treasurer and **John G. Nelson,** secretary and assistant treasurer, American Steel & Wire Co., Cleveland. **John N. Moylan** has been appointed assistant treasurer, with offices in Chicago; **Robert Gordon,** assistant treasurer, with offices in New

R. E. Lewis

York, and **John B. Cavanagh,** assistant secretary at Cleveland.

Mr. Lewis joined American Steel & Wire in September, 1941, as assistant to treasurer, before which he was comptroller, Batten, Barton, Durstine & Osborne, advertising agency. Mr. Nelson has been associated with the Wire company 33 years, holding various clerical and accounting positions before being elected assistant secretary and assistant treasurer in 1928.

♦

Allen H. Stewart has been appointed New York district sales manager, Midvale Co., Nicetown, Philadelphia, to succeed the late R. M. Bird. Mr. Stewart had formerly been Boston representative for the company. He will be succeeded in Boston by **H. Bergholtz Jr.,** heretofore identified with the company's New York office.

♦

George Montague Williams has been elected chairman of the board, American Central Mfg.. Corp., Con-

J. G. Nelson

nersville, Ind. Mr. Williams is also vice chairman of Vultee Aircraft Inc., and chairman and president of Russell Mfg. Co., Middletown, Conn.

♦

Richard N. Armstrong has joined Jessop Steel Co., Washington, Pa., and will be associated with the Tool Steel Division. He formerly was a member of the Iron and Steel Division, British Purchasing Commission, and before that was affiliated with the export sales department of Crucible Steel Co. of America.

♦

Hampson Carey has been appointed assistant treasurer and **James H. Donovan,** manager of credits, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Carey's entire business career has been with Jones & Laughlin, having started in its treasury department in 1920. In 1937 he became manager of collections. Mr. Donovan has been associated with the credit department since 1929.

♦

Ernest C. Roberts, advertising manager, Clark Controller Co., Cleveland, has been elected president, Industrial Marketers of Cleveland. **Wilmer H. Cordes,** manager of advertising and sales promotion, American Steel & Wire Co., has been named vice president, and **R. I. Peterson,** advertising manager, Cleveland Crane & Engineering Co., has been made a member of the board of governors.

♦

Herbert J. French, in charge of alloy steel and iron development, International Nickel Co. Inc., New York, has been nominated for president, American Society for Metals. **Marcus A. Grossmann,** director of research, Carnegie - Illinois Steel Corp., Chicago, is nominee for vice president, while **William H. Eisenman,** 7301 Euclid avenue, Cleveland, has again been named as secretary for two years.

These selections were made at a meeting of the nominating committee in Chicago, May 18. Nominations to the offices virtually assures election at the National Metal Congress in Cleveland, Oct. 12-16.

♦

Benjamin T. Salmon, formerly associated with Vultee, Lockheed and Glenn L. Martin aircraft companies, has been named chief engineer of Ryan Aeronautical Co., San Diego, Calif. **Millard C. Boyd** has been appointed chief development engineer and **Will C. Vandermeer,** chief project engineer.

♦

A. A. Weidman, formerly superintendent of car assembly, Cadillac Motor Car Division, Detroit, has been appointed superintendent of the welding and sheet metal divisions for combat vehicles. **A. J. Renc,** assistant to Mr. Weidman, becomes superintendent of the assembly division for combat vehicles.

♦

Eugene P. Rouge has been appointed comptroller, Monmouth Products Co., Cleveland, manufacturer of king bolt sets, engine bearings, clutch plates and parts. The past several years Mr. Rouge has been a partner in the firm of Moise & Burgess, Cleveland, certified public accountants, and in that connection supervised the accounting practices of Monmouth products.

DIED:

Elwood S. White, 55, president, United States Radiator Corp., New York, in that city, recently. He also was president, Pacific Steel Boiler Corp., Detroit, and Taco Heaters Inc., Stamford, Conn.

♦

Eugene W. Richey, 64, western sales representative, New York Air Brake Co., in Chicago, May 28.

♦

Harry L. Neumeister, 58, associated with Cherry-Burrell Corp. and a predecessor company at Milwaukee, 31 years, at his home in that city, May 30.

♦

Henry H. Scherff, 30, co-owner, Scherff Machine Co., Milwaukee, May 29, in that city.

♦

Harry L. Beers, 67, retired production superintendent, Anaconda Copper Mining Co., May 23, at his home in Norwalk, Conn.

♦

Albert Gage, 62, general foreman since 1920, Decatur, Ind., works of General Electric Co., in that city, May 26.

♦

Fred Greenslade, 73, who retired six years ago as assistant purchasing agent, Crane Co., Chicago, at his home in Highland Park, Ill., June 2.

Canadian Steel Put Under PRP Rules; May Register Women for War Labor

TORONTO, ONT.

NEW regulations have been provided in connection with priorities on steel and allied materials, under the Production Requirements Plan. Materials from the United States will be allotted under this plan, as provided by the War Production Board. Canadian firms must supply information relating to importance of production as related to the war effort, which will govern priority assistance.

Prime contractors for the Department of Munitions and Supply or other government agencies beginning June 1 must provide:

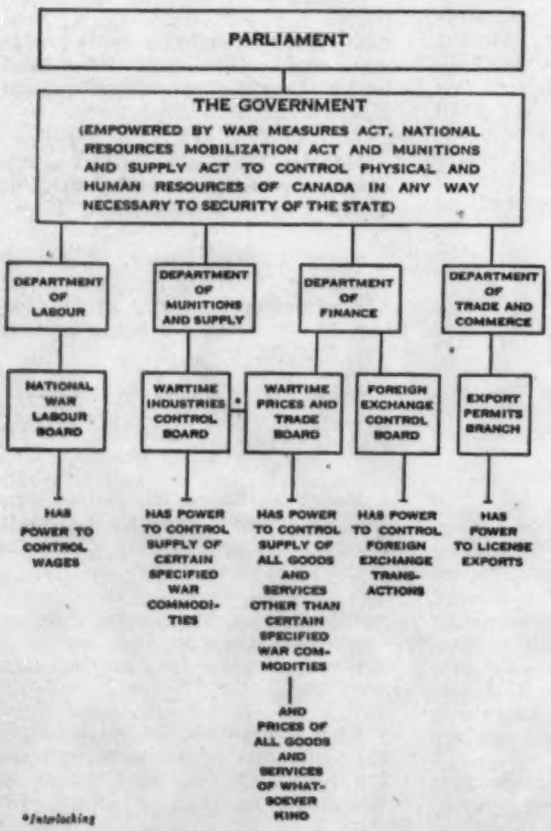
(1) (a) An official PD-3A or PD-1A preference rating certification, or (b) An official certification from any other type of preference rating order, or (c) A Wartime Industries Control Board designation number; and (2) The ultimate or "end use" of the material or product ordered.

Subcontractors, jobbers, etc., must provide: (1) (a) An official certification as described in 1 (a) or 1 (b) above, which has been obtained from the prime contractor; or (b) The War Industries Control Board designation number under which the buyer or prime contractor may be operating; and (2) The ultimate or "end use" of the materials or products which are ordered.

A list of "end uses" follows: Military—Aircraft, ships, vehicles, armaments and weapons, ammunition, war equipment and supplies not otherwise classified, war facilities, such as airfields, bases, camps, forts, navy yards, etc.

Industrial and Civilian—Production and processing of raw materials such as metals, chemicals, etc.; power, light and heat; transportation, communications, public health and safety; agricultural equipment and supplies; industrial food processing; textiles and wearing apparel, equipment and supplies for household use; educational and recreation; equipment and supplies for office use; machinery and equipment for industrial use; construction of new buildings; operating supplies and building repair and maintenance, and all other end uses.

Elliott M. Little, director of National Selective Service, states some nonessential industries may be wholly or partially closed down because of labor shortage. Compulsory registration of all made unemployed, now under way, is not expected to meet labor needs and unemployed women may also be registered.


PARLIAMENT
THE GOVERNMENT
(EMPOWERED BY WAR MEASURES ACT, NATIONAL RESOURCES MOBILIZATION ACT AND MUNITIONS AND SUPPLY ACT TO CONTROL PHYSICAL AND HUMAN RESOURCES OF CANADA IN ANY WAY NECESSARY TO SECURITY OF THE STATE)
DEPARTMENT OF LABOUR
DEPARTMENT OF MUNITIONS AND SUPPLY
DEPARTMENT OF FINANCE
DEPARTMENT OF TRADE AND COMMERCE
NATIONAL WAR LABOUR BOARD
WARTIME INDUSTRIES CONTROL BOARD
WARTIME PRICES AND TRADE BOARD
FOREIGN EXCHANGE CONTROL BOARD
EXPORT PERMITS BRANCH
HAS POWER TO CONTROL WAGES
HAS POWER TO CONTROL SUPPLY OF CERTAIN SPECIFIED WAR COMMODITIES
HAS POWER TO CONTROL SUPPLY OF ALL GOODS AND SERVICES OTHER THAN CERTAIN SPECIFIED WAR COMMODITIES AND PRICES OF ALL GOODS AND SERVICES OF WHATSOEVER KIND
HAS POWER TO CONTROL FOREIGN EXCHANGE TRANSACTIONS
HAS POWER TO LICENSE EXPORTS
*Interlocking

◆

Canada's War Organization

WARTIME economic controls instituted by the Dominion of Canada are shown in the accompanying chart. Canada's war effort in the fiscal year ended in March, 1942, consumed 45 per cent of the Dominion's national income. Chart by National Industrial Conference Board, New York

◆

MEETINGS

Canadian Manufacturers To Consider War, Defense Problems

Canadian Manufacturers' Association will hold its seventy-first annual meeting in Toronto June 8-10. Conferences will be held on production, price control, priorities, manpower, civilian defense and postwar planning. Special technical groups concerned with aircraft, ammunition, ships and munitions will meet with directors general of these branches in the Department of Munitions and Supply.

Additional Features for Mechanical Engineers

E. L. Shaner, editor-in-chief, STEEL, and president, Penton Publishing Co., Cleveland, will be chairman of the panel discussion on Materials Substitution and Salvage, before the Management Division, American Society of Mechanical Engineers, Hotel Statler, Cleveland, June 10. This session will be part of the semiannual meeting of the society, June 8-10.

A paper on "The Role of Scrap Dealers" will be presented by E. C. Barringer, president, Institute of Scrap Iron and Steel Inc., Washington, and one on "The Erie Plan for Salvaging Scrap," by F. E. Bliven, supervisor of salvage, General Electric Co., Erie, Pa.

Testing Society Rounds Out Program for Annual Meeting

More than 100 technical papers and reports are scheduled for the forty-fifth annual meeting of the American Society for Testing Materials in Chalfonte-Haddon Hall, Atlantic City, N. J., June 22-26. More than 150 meetings of technical committees are listed. Eighteen official technical sessions will feature reports and papers.

Industrial Advertisers Will Meet June 29-July 1

Dates of the annual convention of the National Industrial Advertisers Association, Hotel Traymore, Atlantic City, N. J., have been advanced from September to June 29-July 1. Principal sessions will include discussions of the type of advertising to use under present conditions; war production drives; salvage and conservation of material; and training of workers for industry.

Activities of Steel Users and Makers

TWO concerns with war contracts recently were reported ready to take over New Jersey plants. One in Trenton, erected a few years ago by L. A. Young Spring & Wire Co., and recently discontinued due to difficulty in obtaining raw materials, was sold to Defense Plant Corp. for occupancy by General Electric Co. Building has 65,000 square feet of space and railroad siding. The other is a building containing 23,000 square feet, at Oak and Hobart streets, Bayonne, and was transferred by National Cylinder Gas Co., Chicago, to Continental Mining Corp., for production of chrome steel.

♦

Young Radiator Co., Racine, Wis., has appointed Aircraft Steel & Supply Co., Wichita, Kans., sales representative in the southwest and central states area for Young aircraft products.

♦

Fry, Lawson & Co., with offices at 135 South LaSalle street, Chicago, has been organized to practice as consulting management engineers. Associated with George A. Fry, senior member of the company, are A. Warner Lawson, Robert F. Dick, George N. Saum, Kyle L. Menuez and Philip Roden. All were formerly associated with Booz, Fry, Allen & Hamilton, which will continue in the same field as Booz Allen & Hamilton.

♦

American Screw Co., Providence, R. I., has moved its Detroit office from 1847 West Bethune street to room 4-258 General Motors building.

♦

Whiting Corp., Harvey, Ill., has appointed Moore Machinery Co., 1699 Van Ness avenue, San Francisco, representative in California, Arizona and Nevada. Whiting has also named H. C. Donaldson Co., P.O. Box 336, Los Angeles, to represent its Foundry Equipment Division in California, Arizona and Nevada.

♦

International Machine Tool Corp., New York, in six months ended April 30 increased shipment 128 per cent over the period last year, C. Russell Feldmann, president, announced recently.

♦

National Traffic Guard Co., Atlanta, Ga., has purchased and will re-erect in that city a plant formerly used by Gerson Bolt & Nut Co., North Birmingham, Ala. The plant, now being dismantled, has been inactive for 10 or more years.

♦

Ergolyte Mfg. Co., Philadelphia, maker of electric arc welders, has opened a new plant at 3627-29-31 North Lawrence street, Philadelphia, more than twice the size of its former plant, "to keep up with round-the-clock production schedules."

♦

Wheelco Instruments Co., Chicago, has appointed the following district representatives: Pasol Engineering Co. to cover Iowa and Nebraska, with V. E. Lindquist in charge of Iowa office at Des Moines, and I. I. Solzman heading the Nebraska office in Omaha; Fitzgerald Inc., Wichita, Kans., and Charles A. Drum, Houston, Tex.

♦

Swartwout Co., Cleveland, has organized Swartwout Pacific Co., with offices and complete facilities for manufacturing industrial roof ventilators at 560 Seventh street, San Francisco.

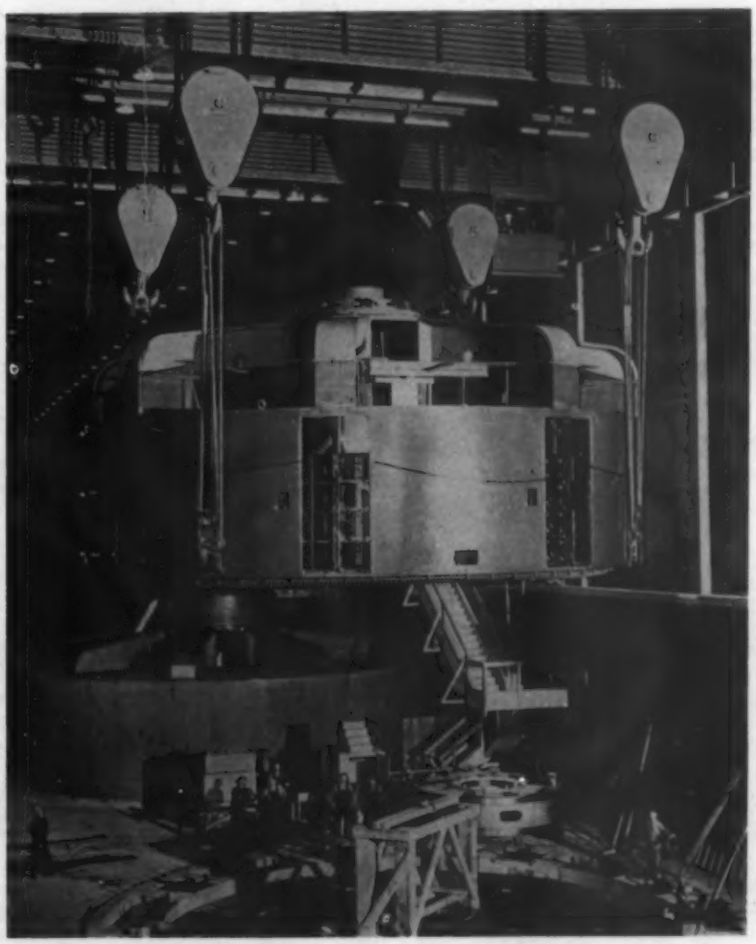
♦

Calumet & Hecla Consolidated Copper Co. has purchased Wolverine Tube Co., Detroit. Operations will continue as the Wolverine Tube Division of Calumet & Hecla. Otto Z. Klopsch will be general manager of the division.

♦

Commemorating its founding 75 years ago, Handy & Harman, New York, refiners and processors of precious metals, held banquets in Bridgeport, Conn., and New York May 14-15 for 600 employes and presented them with an anniversary booklet telling company's history, facilities, products and war work in progress.

◆



SUSPENDED at four points by steel cables and lifted by four mammoth cranes this 108,000 kilowatt generator —one of the world's largest water-wheel generators—was lowered into position in Grand Coulee powerhouse recently. It weighs 1000 tons, diameter is 45 feet; height 24 feet. It is one of three similar units installed at the dam. Westinghouse Electric & Mfg. Co. built all three; is now building six more. Ultimately the powerhouse will contain 18 108,000-kilowatt machines, making it the greatest single source of electric power in the world

Construction Regulations Tightened To Conserve Critical Raw Materials

WASHINGTON

TO MAKE all possible materials and effort available for immediate war production, top WPB officials, and the War and Navy Departments have brought all new construction under rigid conservation control.

No new plants will be built unless they are absolutely necessary to the war effort and can meet seven newly established criteria.

Main reason for the new policy is that all critical materials are needed for war production now, and no materials can be spared for building new facilities not absolutely necessary.

The seven criteria which must be met before any project will be approved for construction follow:

1. It is essential for the war effort.

2. Postponement of construction would be detrimental to the war effort.

3. It is not practical to rent or convert existing facilities for the purpose.

4. The construction will not result in duplication or unnecessary expansion of existing plants or facilities now under construction or about to be constructed.

5. All possible economies have been made in the project, resulting in deletion of all nonessential items and parts.

6. The projects have been designed of the simplest type, just sufficient to meet the minimum requirements.

7. Sufficient labor, public utilities, transportation, raw materials, equipment and the like are available to build and operate the plant. The manufactured product can be used at once or stored until it is needed.

Will Affect Steel

How the new policy will affect the steel expansion program was not immediately made clear, although WPB officials are preparing a report on the status of the program which is expected to be presented to W. H. Harrison, chief of the Production Division, this week. Expansion experts estimate that about 50 per cent of the 10,000,000-ton program already has been completed.

W. L. Batt, chairman of the WPB Requirements Committee, in turning over his duties as Director of Materials to A. I. Henderson last week, said that 65 to 70 per cent of the projected program probably would be completed. At least 70 per cent, and possibly more, of the pig iron program will be carried through.

Mr. Batt said the curtailed steel expansion program still will cost about $1,500,000,000 with industry providing about one-third of this amount and the government the remainder. He said the curtailment was being made due to shortage of critical materials and pointed out that the country could use 100,000,000 tons of steel capacity if it were available.

Other WPB officials said that most projects not started before March 15 would not be completed. WPB's expansion unit still is approving projects but from now on nothing will be approved except electric furnaces, finishing facilities and conversions of foundries.

Five-Point Program

Mr. Batt outlined a 5-point program which is being undertaken to provide raw materials for essential requirements. These are:

1—Long range planning of requirements for materials and careful scheduling to meet them.

2—Revision of specifications to reduce the amounts of scarce materials used.

3—Widespread use of substitutes.

4—A vast increase in civilian cooperation in salvaging to speed the flow of scrap, particularly metals and rubber.

5—Careful handling of scrap and secondary metal by industry to get the greatest possible use from it.

In discussing the raw materials supply situation, Mr. Batt said that there is not enough nickel to fill all demands in spite of the fact that the United States and its allies control practically all of the world's nickel supply.

The United States has allocated $20,000,000 for the production of nickel in Cuba from 1 per cent ore, he said.

On manganese, steps are being taken to produce more than 600,000 tons of low grade ores whereas in 1939 domestic production was some 30,000 tons, while 500,000 tons were imported. In the development of domestic manganese the United States will pay $40,000,000 and private industry about $6,000,000 more. For the duration of the war this program plus other western hemisphere sources will supply the needs of this important steel alloy.

The government is spending $10,000,000 on chrome ore development and private industry about $1,500,000, and this year about three times the 320,000 tons consumed in 1939 will be needed.

On tungsten, as in the other alloying metals, efforts are being made to develop domestic sources. A new deposit was discovered in Valley county, Idaho, and production is being undertaken there. No estimate of production was given.

On aluminum, Mr. Batt said that this country was comfortably fixed. This year actual production of aluminum will reach 1,083,000,000 pounds not counting secondary production or imports. Total supply in 1943 is estimated at 2,500,000,000 pounds. The government is spending $568,000,000 on aluminum facilities and private industry about $85,000,000.

Magnesium production is limited by available electric power but this year output will reach 170,000,000 pounds and the goal is 600,000,000 pounds a year. The government is putting $319,000,000 in magnesium production and private industry about $20,000,000.

On copper, the United States is "uncomfortably short," Mr. Batt said. It is expected that domestic production and imports this year will reach 1,800,000 tons and recovery of scrap will add about 300,000 tons to the store. This is still not enough and every effort is being made to expand copper production domestically through subsidies and in development of new mines, Mr. Batt said. About 98.5 per cent of the domestic copper comes from 15 mines and the other 1.5 per cent from 270-odd mines, he asserted.

April Metalworking Machinery Shipments Continue Upward

Value of new machine tools, presses and other metalworking machinery shipped during April was $114,100,000, William H. Harrison, WPB Director of Production, announced.

Shipments of machine tools alone amounted to 25,415 units, with a total value of $103,364,496. During March, 24,300 units, valued at $98,358,299 were shipped.

Production of metalworking machinery has reached a rate of more than $1,300,000,000 a year and is steadily on the increase. Last year the value of metalworking machinery was about $840,000,000 and the present going rate represents an increase of more than 60 per cent.

Compared with the same month of last year, the April value for all metalworking machinery is an increase of 72 per cent.

On the basis of comparable companies which reported during March and April, the value for the latter month represents a 5 per cent increase. On a per day comparison between the two months, April represents an increase of 8 per cent.

151,000 Added to Steel Employment Force in Two Years

FROM April, 1940 to April, 1942 the number of employes in the steel industry increased 151,000, or 30 per cent. Payrolls in the period were expanded by $50,844,000, or 75 per cent.

The number of employes in September, 1939—at the outbreak of war in Europe—was 502,000. This stepped up in October, November and December that year. In January, 1940, the trend was reversed and by April, 1940 the number had dropped to near the level of September, 1939, when the war started.

In the spring of 1940 the tide turned definitely in the upward direction. Nearly every month in the past two years new gains have swept in.

An all-time peak of 654,000 employes was registered for April this year—latest month for which figures have been compiled by the American Iron and Steel Institute. This number was 1000 more than in March. Payrolls increased in April to $118,568,000, a new record, exceeding the March total of $116,998,000, despite the fact that April had one less working day.

Wage-workers' average hourly earnings in April was 100.4 cents. This was 16.8 cents, or 20 per cent, more than in April, 1940. They worked 39.7 hours per week, in contrast with 33.4 hours in April two years ago.

2,000,0000 War Workers Needed by 1944

More than 20,000,000 workers must be engaged in direct war production by 1944 if production goals are to be attained, according to the Office of Emergency Management.

By mid-November this year, 15,000,000 must be working in war plants, and by New Year's day, 17,000,000 must be so employed.

New war workers, OEM reports, will be recruited from the following classes: From peacetime industries, 7,000,000 to 7,900,000; from the farms, 400,000 to 600,000; from the ranks of the self-employed, professional men, etc., 400,000; from the unemployed, 1,500,000; from housewives, older workers and others not listed as part of the regular labor force, 2,000,000.

United States Employment Service reports a growing shortage of skilled craftsmen. For every skilled tool designer available, 51 are needed. For every toolmaker available, 25 are needed. There are 22 jobs available for every marine machinist, and for every aircraft riveter now employed, four could be used.

"Obviously," says OEM, "under these circumstances a misplaced worker represents a waste of money and energy and—most important of all—a waste of time."

Aircraft Company Employs Policewomen

HAGERSTOWN, MD.: Uniformed policewomen have taken over guard duties in a defense industry—for the first time in the United States. Thirty-two of them, carrying riding crops for arms, have been inducted into their new jobs at Fairchild Engine & Airplane Corp.'s Hagerstown Division. NEA photo

Alternates Enable Saving Of Critical Materials

(*Continued from Page 35*)

note that some 65 to 70 thousand pounds of aluminum were used in this line of production in the form of aluminum paint and sheet stock for nameplates, both of which uses have been completely eliminated, the former by a gray lacquer and the latter mostly by zinc.

"The largest aluminum consuming item in the meter production prior to the substitution covers die-cast bases which have now been replaced by die-cast zinc with a saving of some 275 tons of aluminum a year.

"The second largest saving is achieved by the elimination of aluminum from cases and boxes and the third largest reduction by changing from punched and stamped aluminum parts to steel (or in a few instances to brass) for cover rings, bayonet, clips, registers, seal bars, etc.

"In substituting fiber for aluminum in meter nameplates a yearly saving of some 12 tons of aluminum has resulted. The total saving of aluminum achieved by eliminating its use in nameplates on all GE apparatus is approximately 175 tons a year. The most commonly used alternates for aluminum in nameplates today take in a lead-base alloy, cast iron, etched zinc, fiber and synthetic materials.

"The reduction of aluminum consumption in street lighting equipment is traceable largely to the use of malleable iron, steel and bronze for housings, brackets, hangers and the like, but a considerable quantity has also been eliminated otherwise, as for instance by substituting silvered glass reflectors for anodized aluminum.

"The parts of lightning arrester devices that were formerly made of heat-treated aluminum castings, and to a much smaller extent of sheet and bar stock, constitute fittings and casings which have been changed to hot-dip galvanized steel in some instances with an etching and a paint finish. Some 100 tons of aluminum have been saved by the indicated substitutions.

"Prior to the present conservation effort, a large number of parts such as contact arms, cross heads, supports, frames, hooks, etc. of circuit breakers, and covers, frames and rotors of relays, were made exclusively of aluminum in the switch-

gear division. These are mostly aluminum alloy castings whose light weight was particularly advantageous for parts which must be set in motion and kept moving to get fast breaker operations.

"In some cases fabricated steel parts have been substituted without any increase in weight and thus without a change in the operating speed or in the power required to maintain this speed. In other cases, the substitution has involved castings or fabricated structures of increased weight so that a subsequent change in springs and other parts of the mechanism has been necessary to attain the required motion.

"At this point it may be appropriate to mention an innovation in manufacture which has not directly reduced the amount of material required but which has nevertheless relieved the stress of procurement of a critical material. Reference is made to a method of assembling flat bars into angle or box form for use in place of structural shapes and channels for high-current busbars. The new method is estimated to be more efficient and less costly than the former practice.

"Also, in the change from aluminum to zinc it has been experienced in various connections that where zinc is used either as a body metal or as a plate finish there is a tendency for a whitish powder to form under certain conditions of confinement and moisture. This formation may be sufficient to interfere with the proper functioning of small parts and also to result in the lowering of the electrical characteristics. Work is now in progress to eliminate this possible source of trouble by a suitable treatment of the zinc," Mr. Horn said.

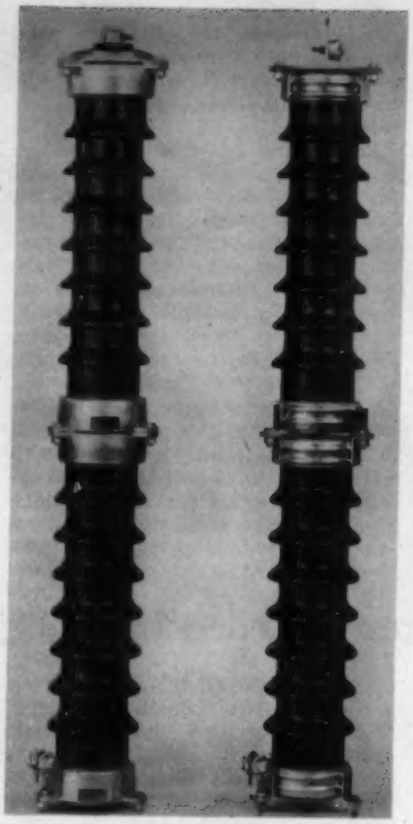
"Among the remaining metals . . . tin comes next to aluminum in respect to quantities consumed for structural use. Its three main uses divide into tin-base bronzes, babbitts, and solders.

Bronzes Offer Hardest Problem

"To date most progress has been made in reducing the tin consumption in the two latter classifications, although the field of bronzes offer a very promising opportunity for sizeable over-all savings of tin.

"The principal reason for the less extensive progress made with the reduction of tin in bronzes appears to be a lack of broad foundry experience with most of the low-tin and tin-free compositions which can be used as alternates. In some quarters also the 'zinc shakes' which are encountered in casting zinc containing alloys figure as obstructions that can be overcome only by improved ventilating provisions which are not always readily installable.

"The composition used in the G-E standard babbitt for rotating apparatus bearings over a period of years is one containing 83 1/3 per cent tin. Since the beginning of January, 1942, as a result of the tin conservation order M-43-a of Dec. 31, 1941, detailed investigations and tests have been made at each of the four GE works building rotating apparatus to find a lead-base composition that could be adopted to replace this former tin-base alloy. This work has entailed a large number of tests and trials, as well as consultations with, and visits to, babbitt manufacturers who figure as the principal suppliers to industry at large.



PARTS of lightning arrestor devices formerly made of heat-treated aluminum castings, and to a much smaller extent of sheet and bar stock, have been changed to hot-dip galvanized steel. General Electric saves 100 tons of aluminum annually. Fitting at left is aluminum; at right, fabricated steel

"The conclusion from this activity is that a lead-base babbitt containing 82½ per cent lead, 15 per cent antimony, 1 per cent arsenic, 1 per cent tin, 0.5 per cent copper is a satisfactory alternate for use in centrifugally cast sleeve bearings.

"On that basis, the manufacture of this type of bearing in our various motor departments has been changed over in part, and is in the process of changeover for the remainder, to the use of this lead-base alloy.

"The resultant saving of tin may conservatively be estimated to be of the order of 200,000 pounds of tin per year at the present rate of production. Stationary-cast bearings (cast-iron shells with dovetail anchorage) involve a problem of proper pre-tinning for the use of this same babbitt composition. Active work on this problem and some trial production are now in progress.

"For larger bearings as required for power-plant turbines and generators, the conservation effort centers around a redesign to use much less material by changing to thin-wall, bonded bearings in contrast to the cast-iron anchorage type.

"For general purpose soldering 40 per cent tin and 60 per cent lead has been the popular composition throughout the company in the past although other higher tin-content materials have also been used to some extent for general purpose work. As an alternate for these materials several compositions of lower tin content have been proved applicable.

Use Silver Brazing

"Some of these, such as the 20 per cent tin, 1 per cent silver, 79 per cent lead have been found adoptable with but minor changes in technique, temperatures and operating schedules. Others, such as the 97½ per cent lead, 2½ per cent silver composition, have not proved immediately applicable for use with the available soldering irons and also require modifications in technique and incur lengthened operation schedules.

"To gain further experience, however, a number of compositions between the 20 per cent tin solder down to the no-tin materials such as the 97½ per cent lead, 2½ per cent silver have been placed in operation for a final selection of specific varieties to meet the particular requirements of each operation.

"As an indication of the progress that has been made in this connection, 10,000 pounds of the 20 per cent tin, 1 per cent silver, 79 per cent lead composition in both rosin-core and solid form has recently been stocked at one of the company's works for replacement of the 40-60 composition.

"As for electrical joints, particularly those involving reasonably heavy conductors for which 100 per cent tin has been used in the past as a standard to produce strong reliable connections, changes have been made to the use of silver brazing with the exclusion of tin. A typical example covers commutator riser joints on large machines.

"Another case of a change from soldering to brazing is represented by transformers where all the copper conductors including application of terminals, have been brazed for some years because of the superior quality of joints obtained by this

method. About 60 different types of joints and connections in electrical conductors are designed to be heated with carbon blocks and to be made up with Silfos. Portable brazing equipment (brazing tongs) permit terminals to be applied in almost any locations.

"In the use of soldering pots for hot dipping, good results have been obtained with 90 per cent lead 10 per cent tin, and experience is rapidly being gained with this and similar low-tin content materials in a large number of soldering pots through the various plants. A complete changeover to the use of these new materials will be effected in the near future.

"As regards all other solders of tin contents that exceed the 30 per cent tin limit, a similar status exists. With but a few exceptions changes have been made to low-tin compositions which are being tried out in the various uses to establish the very lowest limits that we can go to in regular production.

"There are, however, a few exceptions on which we have had no success to date in the search for replacement materials. One of these takes in the soldering of leads to commutators where pure tin appears to be the only material that will give safe joints under the temperatures reached in actual operation, particularly in the case of small high-speed armatures. Because of the centrifugal force, the solder tends to be thrown out from the joints at relatively low temperature whereas pure tin remains solid and does not fail in this respect until the melting point of tin is reached.

"Further, there are several sealing operations on two or three different products which we have not as yet been able to produce with solders of less than 60 per cent tin. One of these operations concerns the sealing of capacitor cans by a dipping method to produce an absolutely tight seal without which a satisfactory product is not obtained. Several new compositions are now on production trial, and a study has been made of a different method of sealing. The latter change would require several special machines which are not readily available.

Lead-Silver Solder Satisfactory

"Wiping of cable joints represents another operation for which a definite alternate for the 40-60 solder used in the past has not yet been found. The indications are that tin solders with less than 38 per cent tin cannot be worked in a practical way to produce reliable nonporous wipes. On a trial basis good results have been obtained, however, with certain tinless solders and these are now being further explored.

"On the whole, the substitutions that have been made, and those that will be made in the very near future, account for tin savings of more than 50 per cent of all the tin that would be required if these alternates were not in the picture.

"The following is an interesting test result arrived at in the investigation of low-tin solders. Having observed that lead-silver solder was much inferior to 60-40 tin solder when subject to vibration, the question arose as to whether a terminal soldered to cable with the lead-silver composition would be weaker than the cable itself. This question was checked with cables having the terminal at one end soldered with tin and the other with lead-silver. Completed, these cables were vibrated some 550 thousand times and in each case the cable failed approximately ½ in. from the terminal, indicating that the lead-silver solder is fully satisfactory for soldering terminals to cables that will be subject to vibration. . .

"Alloy steel and copper, of course, are both very large-usage materials in General Electric.

"As for alloy steels, they can hardly be discussed in a general review of substitution of the present character, because the varieties are all too numerous and any of these may in turn be replacable by several other compositions, all depending upon the particular application. It will suffice to say, therefore, that all applications of these alloys receive individual attention from time to time with a sincere aim towards conserving critical ingredients wherever possible.

"Copper holds a unique position of importance to the present status of electrical engineering as a whole, and wherever it serves as a conductor it can only be replaced in rare instances.

"Any conservation effort on copper therefore reduces itself almost

DESIGNED to eliminate vital materials needed for the war effort, General Electric Co. has developed (at left) a shatterproof floodlight entirely of glass. Reflector is coated with an electrolytically deposited metal which with an overall backing of porcelain enamel will keep the glass from shattering even if it is broken by a severe blow. At right is shown a testman with a new street light, the efficiency of which has been increased 10 per cent by use of a silvered glass reflector instead of the highly polished aluminum reflector previously used

MAGNITUDE of numerous unconventional machining operations which must be accomplished in building a ship is indicated by this manganese bronze propeller—"in process". The blades have been dressed off with hand grinders, but still have to be finish machined. Propeller is blocked in place astride the bed of a horizontal machine for boring and facing the massive hub. Note the "sweep tool" with traveling carriage and star wheel feed mechanism, by means of which a single point cutter is traversed across the face of the hub while the entire tool carrying unit is revolved by the rigid central bar. Photo, Cramp Brass & Iron Foundries Division, Baldwin Locomotive Works, Philadelphia

entirely to a search for the most economical utilization of the very smallest quantity of copper that will do the job. Prior to the present material shortage copper did, however, have numerous applications for nonconductor uses. All of these have been carefully investigated and in a good many of them copper has been replaced with steel, malleable iron, terne plate, brass, bronze and zinc.

"Wherever steel is found to be an applicable replacement material in such cases, the principal problem appears to be one of providing a sufficient protective coating to counteract corrosion. Use of such coatings in turn may introduce a problem of insuring against the formation of chemical products that will be harmful to the metal itself.

"Further, a small percentage of copper added to steel has proved a valuable means for improving steel's resistance to atmospheric corrosion as much as three to five times. These uses of copper have been eliminated by resorting to other means of protection.

"There are also a number of applications of copper and copper alloys in connection with transformer and oil circuit bushings and the like where it is used because of its nonmagnetic properties to avoid stray currents and objectionable local heating. In the attempt to conserve copper in such uses, the expediency of moving the parts far enough away from the electrical conductors to prevent the undesirable effect has been applied.

"In several instances, however, this remedy has proved to increase the size of the complete apparatus to such an extent that the over-all quantity of copper and other critical materials consumed has proved to increase.

"The statement in the foregoing to the effect that copper for conducting purposes can be replaced only in rare instances may shortly need to be modified. The fact in this connection is that transformers are on order in which 150,000 lb. of silver will be used in place of the copper that would normally be employed. . . .

"Chromium and nickel have a special resistance material used extensively in control-device resistors and heaters. In some cases where the resistor forms an external part of the device, and where sufficient space is available, nichrome wire can be conserved by a change to cast-iron grid resistors.

"Many applications remain where the resistor or the heating unit forms a compact element which in turn is a component part of a complete assembly, and for elements of this nature the search to date has not yielded a practical alternate material. Experiments and trials are continuously underway aiming at the production of a suitable alternate for nichrome wire for these applications."

Revised Classification of Scarce Metals Issued by War Board

FORTY additional items have been added to groups 1 and 2 of WPB's classification of scarce materials, issued by the Conservation and Substitution Branch.

Revised classification follows:

Group 1: Available supply of the following metals is inadequate for war and essential civilian uses and in many cases for war purposes alone: Alloy iron, alloy steel, aluminum, aluminum pigments, cadmium, calcium-silicon, chromium, cobalt, columbium, copper, copper scrap, iridium, magnesium, manganese, (electro) nickel, nickel scrap, rhodium, tantalum, tin, tin plate and terne plate, tungsten, tungsten carbides, vanadium, wrought iron, zinc (high grade).

Group 2: Metals that are essential to the war industries but the supplies of which are not limited as those of group 1: Aluminum scrap, (No. 12, remelt), antimony, arsenic, bismuth, calcium, ferrosilicon iron, (gray, cast, malleable), lead, lithium, ferromanganese, mercury, molybdenum, palladium, pig iron and scrap, platinum, ruthenium, silicon and alloys, steel (bessemer, carbon, basic, scrap), zinc (low grades), uranium.

Group 3: Metals that are generally available in significant quantities as substitutes for less available materials: Gold, indium, osmium, silver.

For listing of strategic and critical war materials, their uses and availability, see STEEL, May 4, page 68.

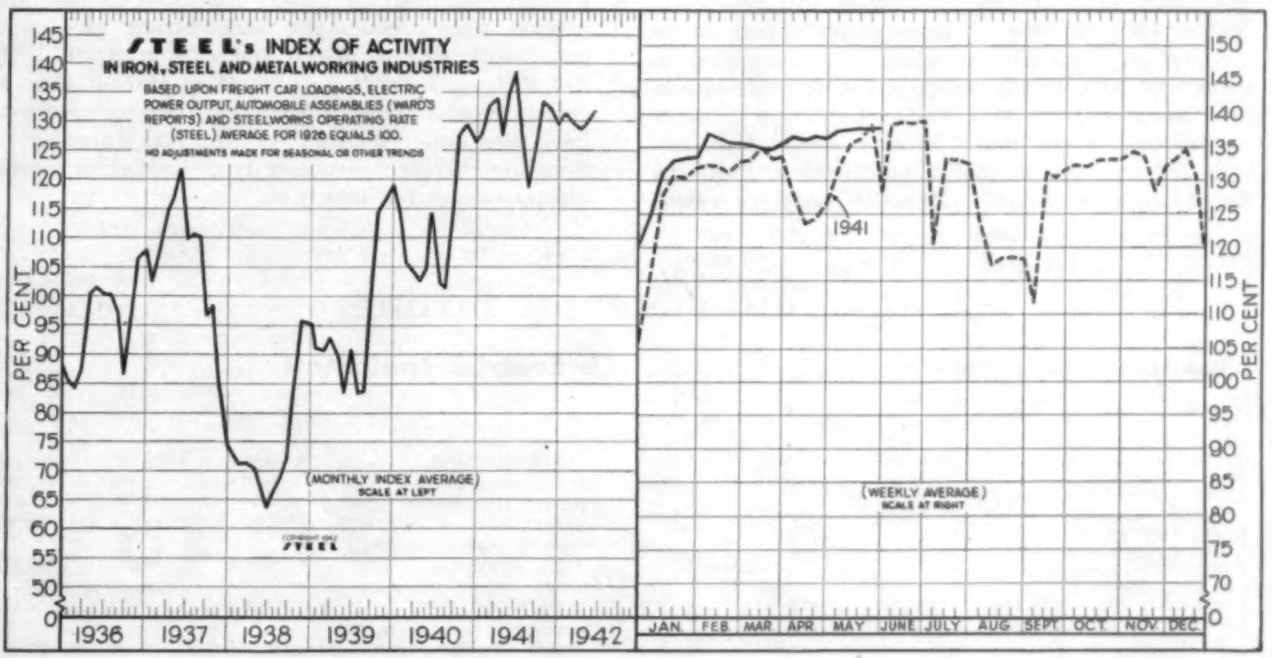
Index of Activity Moving Sidewise

BRIGHTER news of war production claimed attention throughout May, as many plants reported completion of additions and delivery of war materiel ahead of contract schedules. However, some indices of activity in major industries receded slightly in the final week.

Carloading reports for the week ended May 30 totaled 795,756 cars, a decrease of 41,992 from the previous week and 6027 below the like week a year ago. Electric power output, at 3,322,651 kilowatts, showed a loss of 1.1 per cent. While both indicators reflected the Memorial Day interlude, steel production rate held firm at 99 per cent of capacity, bolstered by huge order backlogs which clog mill books. STEEL's Index of Activity edged downward 2.1 points in the week to 136, with the index for the month standing at a preliminary figure of 132.4.

Some hesitation in the quickening tempo of industrial production has been caused by uncertainties and confusion resulting from government directives aimed at conservation of strategic raw materials and the introduction of the Production Requirements Plan and "end-use" system of classification.

Conversion of manufacturing facilities to war purposes was hastened by General Conservation Order M-126, banning use of iron and steel in non-essential products and compelling companies not yet participating in the war effort to seek ordnance subcon-


STEEL's INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100.
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
(MONTHLY INDEX AVERAGE) SCALE AT LEFT
(WEEKLY AVERAGE) SCALE AT RIGHT
1941
1936 1937 1938 1939 1940 1941 1942
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

STEEL's index of activity declined 2.1 points to 136 in the week ending May 30:

Week Ended	1942	1941
Mar. 28	135.8	133.9
April 4	136.7	128.9
April 11	136.1	123.8
April 18	136.6	124.2
April 25	136.3	126.5
May 2	137.2	132.6
May 9	137.5	135.9
May 16	137.9	136.1
May 23	138.1†	138.6
May 30	136.0	128.4

†Revised.

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	131.3	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	129.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
March	128.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
April	129.5	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May	132.4	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	.....	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	.....	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.	.....	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	.....	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Oct.	.....	133.1	127.8	114.9	83.6	96.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	.....	132.2	129.5	116.2	95.9	84.1	108.4	88.1	54.9	52.8	47.5	54.4
Dec.	.....	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3

tracts or close their plants. Other restrictive measures are anticipated.

Additional war plant expansion has been curtailed as a direct result of material shortages.

Much stress has been laid upon substitution of wood and cement for steel in construction and the replacement of scarce metals with synthetics and other metals where stocks are more ample. The new NE steels are a notable example of this trend.

Intensified nation-wide scrap drives appear to be yielding good results and offer some assurance, in connection with anticipated record movements of iron ore, that steel production may continue at peak rates throughout the summer. In May all previous records for iron ore shipment were broken when the Great Lakes fleet brought down 12,677,356 gross tons, an increase over May, 1941, of 14.4 per cent.

Employment in 90 industries, as recorded by the U. S. Department of Labor, continued to rise, the average weekly hours per worker being 42.5, compared with 42.2 in March and 40.4 in April, 1941. Yet there still exists a shortage of skilled labor in certain key industries. Elaborate training programs have been designed to fill this gap and a number of firms are currently installing large batches of graduate trainees in full time jobs.

Where Business Stands

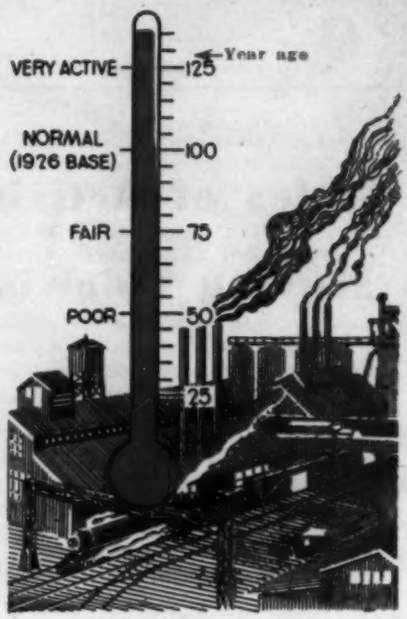
Monthly Averages 1941 = 100

	Apr., 1942	Mar., 1942	Apr., 1941
Steel Ingot Output	104.0	104.9	122.9
Finished Steel Shipments	103.1	104.5	99.0
Freight Carloadings	103.0	97.5	102.6
Freight Car Awards	209.8	198.1	99.3
Structural Steel Bookings	93.8	98.5	101.1
Building Construction	99.6	122.0	121.8

Industrial Weather

TREND:

Sidewise



The Barometer of Business

Financial Indicators

	Apr., 1942	Mar., 1942	Apr., 1941
30 Industrial Stocks*	95.35	101.62	119.10
20 Rail Stocks*	24.30	26.09	28.48
15 Utilities*	10.97	12.15	18.66
Average Price of all listed bonds (N.Y.S.E.)	95.63	95.97	94.32
Bank Clear'gs daily average (000 omitted)	1,108,132	1,164,204	1,048,450
Commercial Paper, interest rate (4-6 months)	0.56	0.56	0.56
Com'l loans (000 omitted)‡	$11,337	$11,394	39,870
Federal Reserve ratio (per cent)	90.6	90.9	91.3
Capital flotations (000 omitted)			
New Capital	$157,820	$103,551	$746,802
Refunding	$104,328	$87,597	$174,640
Federal gross debt, (mil. of dol.)	$64,961	$62,419	$47,236
Railroad earnings†	$92,355,539	$66,486,021	$80,170,452
Stock sales, New York Stock Exchange	7,589,297	8,587,828	11,185,760

*Dow Jones series.
‡Leading member banks Federal Reserve System.
†February, January and February respectively.

Commodity Prices

	Apr., 1942	Mar., 1942	Apr., 1941
STEEL'S composite finished steel price average	$56.73	$56.73	$56.73
U. S. Bureau of Labor's index	98.8	97.6	85.5
Wheat, cash (bushel)	$1.215	$1.25	$0.928
Corn, cash (bushel)	$0.998	$0.996	$0.745

Industrial Indicators

	Apr., 1942	Mar., 1942	Apr., 1941
Iron and Steel Scrap consumption (tons)*	4,840,000	4,276,000	4,662,000
Gear Sales Index	378	455	292
Foundry equipment new order index	1089.3	1122.3	377.2
Finished steel shipments (Net tons)	1,758,894	1,780,938	1,687,674
Ingot output (average weekly; net tons)	1,660,213	1,668,829	1,574,401
Dodge bldg. awards in 37 states ($ Valuation)	$498,742,000	$610,799,000	$406,675,000
Fabricated structural steel shipments (Tons)	176,894	184,715	189,751
Steel castings output (Net Tons)	211,081	179,880	126,140
Coal output, tons	49,000,000	47,400,000	5,975,000
Business failures; number*	1,048	916	1,211
Business failures; liabilities*	$85,000	$70,000	$105,000
U. S. Dept. of Labor (90 industries, factory):			
Av. wkly. hrs. per worker*	42.5	42.2	40.4
Av. weekly earnings*	$36.15	$35.76	$29.11
Cement production, bbls.	14,068,000	12,733,000	12,196,000
Cotton consumption, bales	998,754	966,631	920,950
Freight Car Awards	2,125	4,080	14,645
Car loadings (weekly av.)	837,759	792,860	717,573

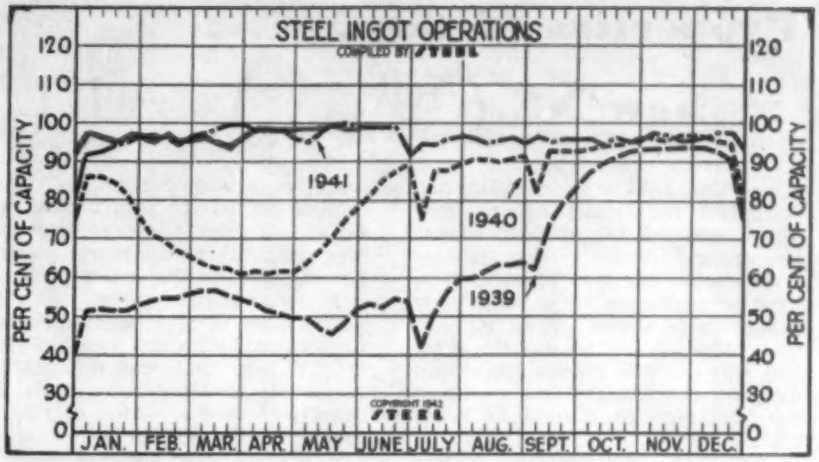
*March, February and March respectively.

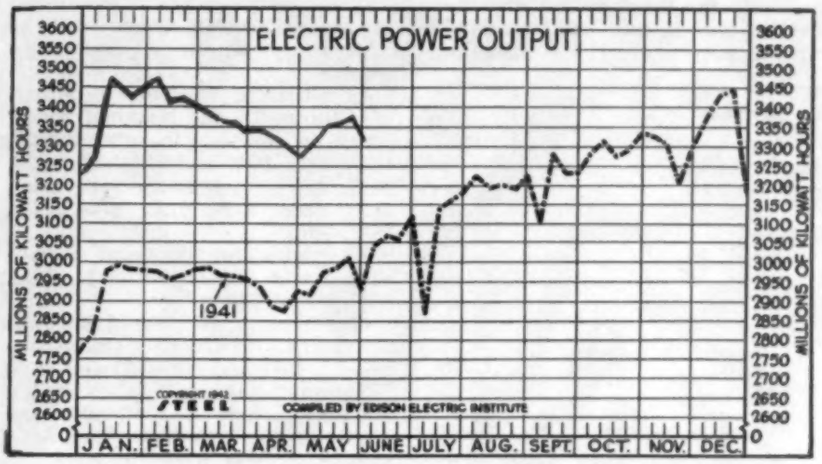
Steel Ingot Operations

(Per Cent)

Week ended	1942	1941	1940	1939
May 30....	99.0	99.0	78.5	52.0
May 23....	99.0	100.0	75.0	48.0
May 16....	99.5	99.5	70.0	45.5
May 9....	99.0	97.5	66.5	47.0
May 2....	99.0	95.0	63.5	49.0
April 25...	98.5	96.0	61.5	49.0
April 18...	98.5	98.0	61.5	50.5
April 11...	98.5	98.0	61.0	51.5
April 4....	98.0	98.0	61.5	53.5
Mar. 28....	97.5	99.5	61.0	54.5
Mar. 21....	95.5	99.5	62.5	55.5
Mar. 14....	95.5	98.5	62.5	56.5
Mar. 7.....	96.5	97.5	63.5	56.5
Feb. 28....	96.0	96.5	65.5	56.0
Feb. 21....	96.0†	94.5	67.0	55.0

†Since Feb. 21 rate is based on new capacity figures as of Dec. 31 last.




ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Electric Power Output

(Million KWH)

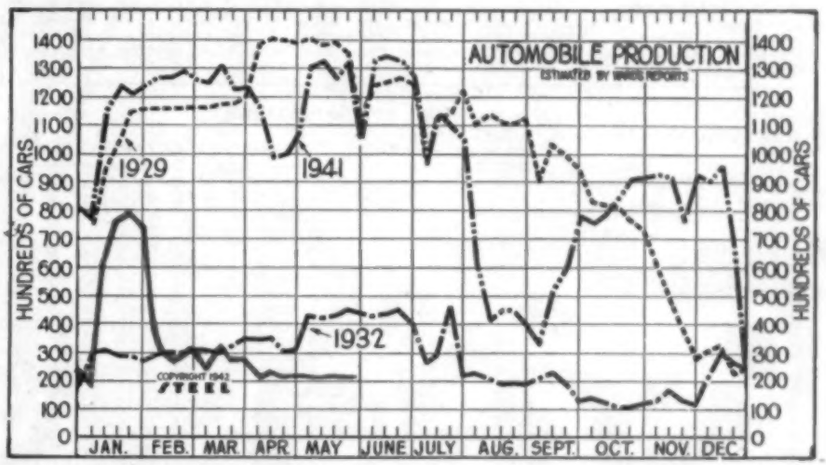
Week ended	1942	1941	1940	1939
May 30.....	3,323	2,730	2,332	2,204
May 23.....	3,380	3,012	2,589	2,778
May 16.....	3,357	2,983	2,550	2,235
May 9.....	3,351	2,975	2,516	2,239
May 2.....	3,305	2,915	2,504	2,225
April 25.....	3,299	2,926	2,499	2,244
April 18.....	3,308	2,874	2,529	2,265
April 11.....	3,321	2,882	2,530	2,235
April 4	3,349	2,938	2,494	2,244
Mar. 28.....	3,346	2,956	2,524	2,272
Mar. 21.....	3,357	2,964	2,508	2,258
Mar. 14.....	3,357	2,965	2,550	2,276
Mar. 7.....	3,392	2,987	2,553	2,285
Feb. 28.....	3,410	2,982	2,568	2,294
Feb. 21.....	3,424	2,968	2,547	2,289
Feb. 14.....	3,422	2,959	2,565	2,297

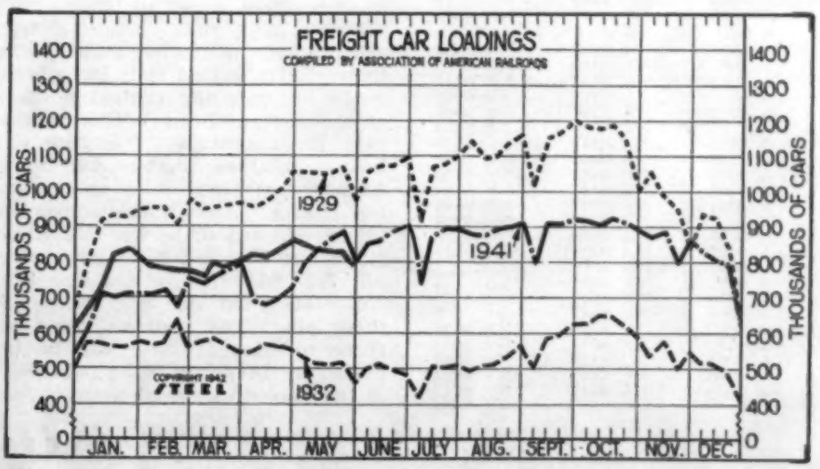
Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
May 30....	21.5	106.4	61.3	32.4
May 23....	21.6	133.6	96.8	67.7
May 16....	21.8	127.3	99.0	80.1
May 9....	21.5	132.6	98.5	72.4
May 2....	22.0	130.6	99.3	71.4
April 25...	21.9	108.2	101.4	86.6
April 18...	21.7	99.9	103.7	90.3
April 11...	23.0	99.3	101.9	88.1
April 4....	22.3	116.3	101.7	87.0
Mar. 28....	28.9	124.2	103.4	86.0
Mar. 21....	28.9	123.8	103.4	89.4
Mar. 14....	30.6	131.6	105.7	86.7
Mar. 7.....	24.5	125.9	103.6	84.1
Feb. 28....	30.1	126.6	100.9	78.7
Feb. 21....	25.7†	129.2	102.7	75.7

†Canadian trucks and automobiles and United States trucks, since Feb. 21.





Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
May 30.....	796	802	639	568
May 23.....	838†	866	687	628
May 16.....	839	861	679	616
May 9.....	839	837	681	555
May 2.....	859	794	666	573
April 25.....	855	722	645	586
April 18.....	847	709	628	559
April 11.....	814	680	619	548
April 4.....	829	683	603	535
Mar. 28.....	805	792	628	604
Mar. 21.....	797	769	620	605
Mar. 14.....	799	759	619	595
Mar. 7.....	771	742	621	592
Feb. 28.....	781	757	634	599

†Revised.

Properties of the . . . .

New NE (National Emergency) ALLOY STEELS

A FOUNDATION already has been laid for tabulating information about the new NE (National Emergency) steels. Within the last few months samples of each type have been shipped by at least four producers to several users, in each case, who agreed to use the steel and test it. The results have been graphed and charted and represent the beginning of a fund of information.

This work, which involves free exchange of information on the part of all interests involved, and a complete elimination of the "trade secrets" of ordinary times, is under sponsorship of the War Production Board, with the American Iron and Steel Institute acting as the vehicle for distributing the information as it is accumulated.

The work is of vital significance to steel producers and users in view of the fact that the information previously covering alloy steels, accumulated over a period of two to three decades, now is quite useless. The highly alloyed steels of the past are "out" for the duration and the present era is one of stretching out the supply of critical alloying elements so as to permit fullest use of the quantities that are available.

Up to date some 50 charts have been prepared showing results of tests of various NE steels. While these are only single-heat results, they are regarded as informative in a preliminary way. The study continues to be conducted actively so that additional results will become available in the near future. Current indications justify the hope that the main points of confusion in regard to NE steels will be cleared up within a few more months.

As set forth in STEEL of March 16, 1942, p. 72, the National Emergency list of steels includes A 4027, 4037, 4063, 4068 and NE 8024, 8124, 8233, 8245, 8339, 8442, 8447, 8547, 8620, 8630, 8724, 8739, 8744, 8749, 8817, 8949.

Alternates for standard carburizing steels include NE 8024, 8124, 8620, 8817, 8724.

Alternates for semi-thorough water and oil hardening steels comprise A 4037 and NE 8233 and 8630.

Thorough-hardening steels on the NE list include A 4047, 4063 and 4068 and NE 8245, 8339, 8442, 8447, 8547, 8739, 8744, 8749 and 8949.

Herewith are presented single-heat test results obtained on seven different NE steels.

It will be noted that the chart labeled 8520 also covers 8724. This is due to residual alloys which might throw the steel into either class.

Two charts are shown for the 8630 composition, one giving properties as tested in 1-inch round and the other in ¾-inch round.

Two charts cover the 8739 composition, one giving test properties on 1-inch round and the other on 3-inch round.

Three charts are shown for the 8749 composition, comprising results from testing 1-inch, ¾-inch and 0.530-inch round.

Other charts will be published in subsequent issues of STEEL.

Please note that certain charts are marked "estimated values". On these charts, actual tests have been made for only the central portion of the curves shown. This means that it is probable that the extremes of these curves will vary from the straight lines shown on the charts. Among the charts in this group are those for: NE 8739, grain size 8/7; NE 8630, grain size 8-7; NE 8620-8724, grain size 8-7; NE 8744, grain size 8/7. Some of these charts as well as some of those mentioned above will be included in the group to be published in the June 15 issue of STEEL.

Table I—AVAILABLE STEELS

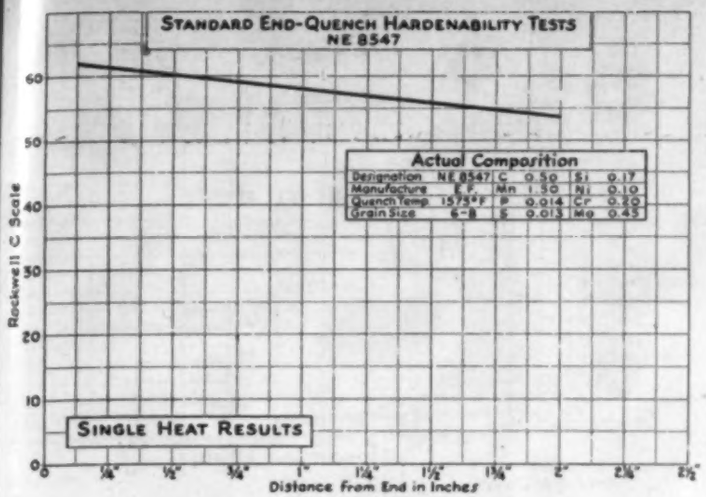
SAE or AISI Number	C	MN	NI	CR	MO
A 4027	.25-.30	.70- .90	.....	.....	.20-.30
A 4037	.35-.40	.75-1.00	.....	.....	.20-.30
A 4063	.60-.67	.75-1.00	.....	.....	.20-.30
A 4068	.64-.72	.75-1.00	.....	.....	.20-.30
NE 8024	.22-.28	1.00-1.30	.....	.....	.10-.20
NE 8124	.22-.28	1.30-1.60	.....	.....	.25-.35
NE 8233	.30-.36	1.30-1.60	.....	.....	.10-.20
NE 8245	.42-.49	1.30-1.60	.....	.....	.10-.20
NE 8339	.35-.42	1.30-1.60	.....	.....	.20-.30
NE 8442	.38-.45	1.30-1.60	.....	.....	.30-.40
NE 8447	.43-.50	1.30-1.60	.....	.....	.30-.40
NE 8547	.43-.50	1.30-1.60	.....	.....	.40-.60
NE 8620	.18-.23	.70- .95	.40-.60	.40-.60	.15-.25
NE 8630	.27-.33	.70- .95	.40-.60	.40-.60	.15-.25
NE 8724	.22-.28	.70- .95	.40-.60	.40-.60	.20-.30
NE 8739	.35-.42	.75-1.00	.40-.60	.40-.60	.20-.30
NE 8744	.40-.47	.75-1.00	.40-.60	.40-.60	.20-.30
NE 8749	.45-.52	.75-1.00	.40-.60	.40-.60	.20-.30
NE 8817	.15-.20	.70- .95	.40-.60	.40-.60	.30-.40
NE 8949	.45-.52	1.00-1.30	.40-.60	.40-.60	.30-.40

All of the above steels contain .20-.35 silicon and .040 maximum each sulphur and phosphorous. In addition to the above, the usual plain carbon (1000 series) high sulphur (1100 series), high phosphorous (1200 series), silico manganese (9200 series) steels are available in the various carbon ranges, as are, also, certain other carbon molybdenum (4000 series) steels.

Table II—STEEL SPECIFICATIONS

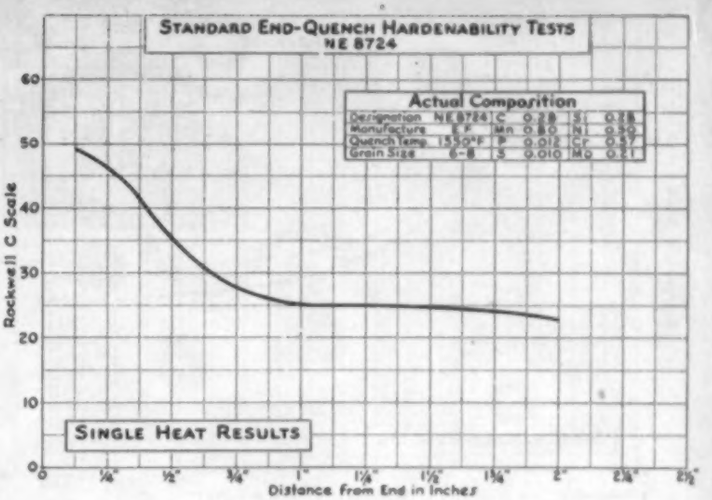
—STANDARD SERIES DESIGNATION— 1942 AISI Number	1941 AISI Number	1942 SAE Number	1941 SAE Number	POSSIBLE ALTERNATIVES —SAE or AISI Number—		
				Number	Number	Number
A 1320	A 1321	1320	.....	A 4027	NE 8024	.....
A 1330	A 1330	1330	1330	A 4037	NE 8233	.....
A 1340	A 1340	1340	1340	A 4047	NE 8245	.....
A 2317	A 2317	2317	2315	A 4027	NE 8024	NE 8620
A 2330	A 2330	2330	2330	A 4037	NE 8233	NE 8630
A 2335	A 2335	.....	.....	A 4063	NE 8339	NE 8739
A 2340	A 2340	2340	2340	A 4068	NE 8442	NE 8744
A 2345	.....	2345	2345	A 4068	NE 8447	NE 8749
WD2350	.....	.....	.....	A 4068	NE 8547	NE 8949
A 2515	A 2514	2515	2515	A 4027	NE 8817	.....
A 3045	A 3045	.....	.....	A 4068	NE 8442	NE 8744
A 3120	A 3120	3120	3120	A 4027	NE 8024	NE 8620
A 3130	A 3130	3130	3130	A 4037	NE 8233	NE 8630
A 3135	A 3135	3135	3135	A 4063	NE 8339	NE 8739
A 3140	A 3140	3140	3140	A 4068	NE 8442	NE 8744
A 3141	A 3141	3141	X3140	A 4068	NE 8447	NE 8749
A 3145	A 3145	3145	3145	A 4068	NE 8447	NE 8749
A 3150	A 3150	3150	3150	A 4068	NE 8547	NE 8949
A 3240	A 3240	3240	3240	A 4068	NE 8442	NE 8744
WD3250	.....	.....	.....	A 4068	NE 8547	NE 8949
A 4119	A 4119	4119	.....	A 4027	NE 8024	.....
A 4130	A 4130	4130	X4130	A 4037	NE 8233	NE 8630
A 4137	A 4137	4137	.....	A 4063	NE 8339	NE 8739
A 4142	A 4142	.....	.....	A 4063	NE 8442	NE 8744
A 4145	.....	4145	.....	A 4068	NE 8477	NE 8749
A 4150	.....	4150	4150	A 4068	NE 3547	NE 3949
A 4320	A 4320	4320	4320	.....	NE 8124	NE 8724
A 4340	.....	4340	X4340	A 4068	NE 8547	NE 8949
A 4620	A 4620	4620	4620	A 4027	NE 8024	NE 8620
A 4640	.....	4640	4640	A 4063	NE 8339	NE 8739
A 4645	.....	.....	.....	A 4068	NE 8447	NE 8744
A 4650	.....	.....	.....	A 4068	NE 8547	NE 8949
A 4820	A 4821	4820	4820	.....	NE 3124	NE 8724
A 5045	A 5045	.....	.....	A 4063	NE 8339	.....
A 5120	A 5120	5120	5120	A 4027	NE 8024	.....
A 5130	A 5130	.....	.....	A 4037	NE 8233	.....
A 5140	.....	5140	5140	A 4063	NE 8339	.....
A 5145	A 5145	.....	.....	A 4068	NE 8442	.....
A 5150	A 5152	5150	5150	A 4068	NE 8447	
A 6120	A 6120	.....	.....	A 4027	8024	NE 8620
.....	.....	6130	.....	A 4037	NE 8233	NE 8630
WD6140	.....	.....	.....	A 4063	NE 8339	NE 8739
A 6145	.....	.....	.....	A 4068	NE 8442	NE 8744
A 6150	.....	6150	6150	A 4068	NE 8447	NE 8749

Standard End-Quench Hardenability Tests
NE 8547



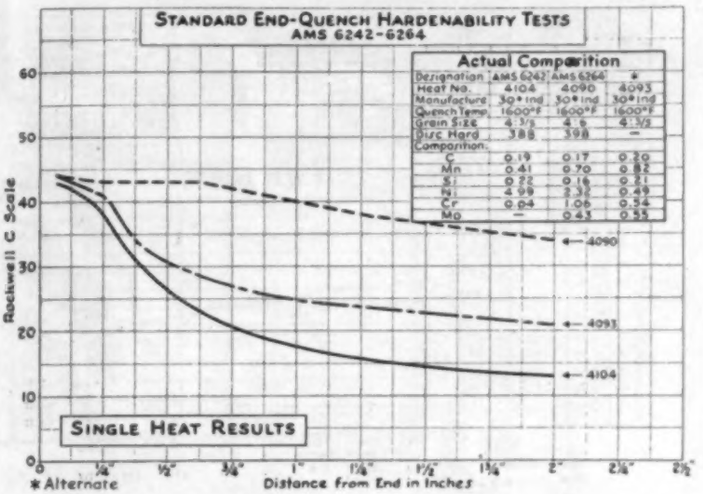
Actual Composition					
Designation	NE 8547	C	0.50	Si	0.17
Manufacture	E F	Mn	1.50	Ni	0.10
Quench Temp	1575°F	P	0.014	Cr	0.20
Grain Size	6-8	S	0.013	Mo	0.45

Standard End-Quench Hardenability Tests
NE 8724



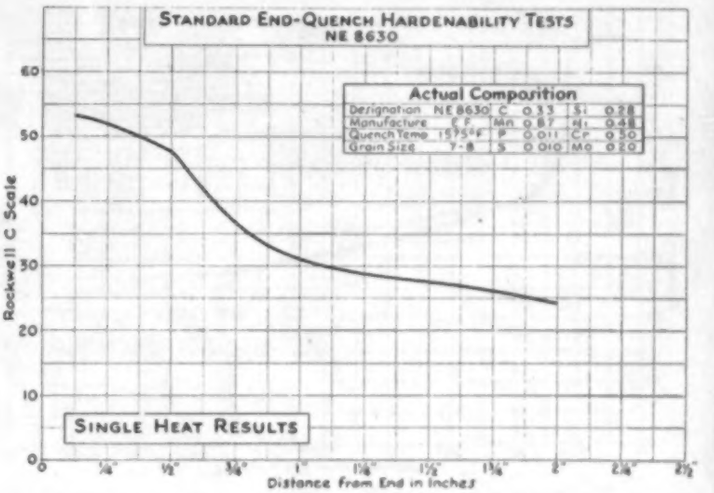
Actual Composition					
Designation	NE 8724	C	0.28	Si	0.28
Manufacture	E F	Mn	0.80	Ni	0.90
Quench Temp	1550°F	P	0.012	Cr	0.57
Grain Size	6-8	S	0.010	Mo	0.21

Standard End-Quench Hardenability Tests
AMS 6242-6264



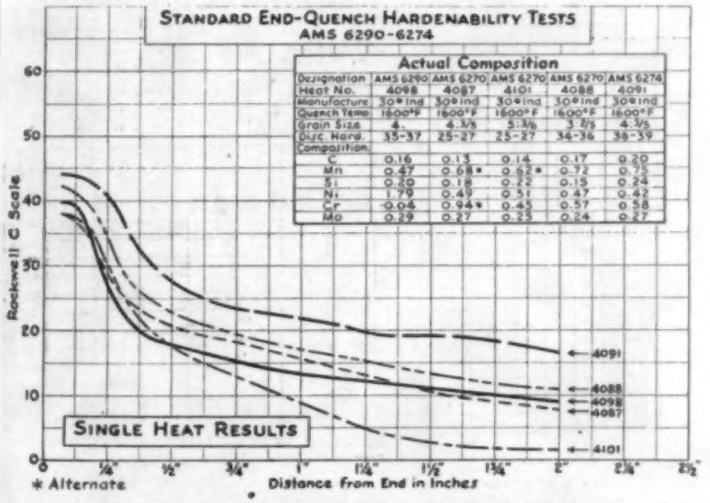
Actual Composition			
Designation	AMS 6242	AMS 6264	*
Heat No.	4104	4090	4093
Manufacture	30# Ind	30# Ind	30# Ind
Quench Temp	1600°F	1600°F	1600°F
Grain Size	4-5/8	4-6	4-1/2
Dyrc. Hard	388	398	—
Composition:			
C	0.19	0.17	0.20
Mn	0.41	0.70	0.82
Si	0.22	0.16	0.21
Ni	4.99	3.33	0.48
Cr	0.04	1.06	0.94
Mo	—	0.43	0.55

Standard End-Quench Hardenability Tests
NE 8630



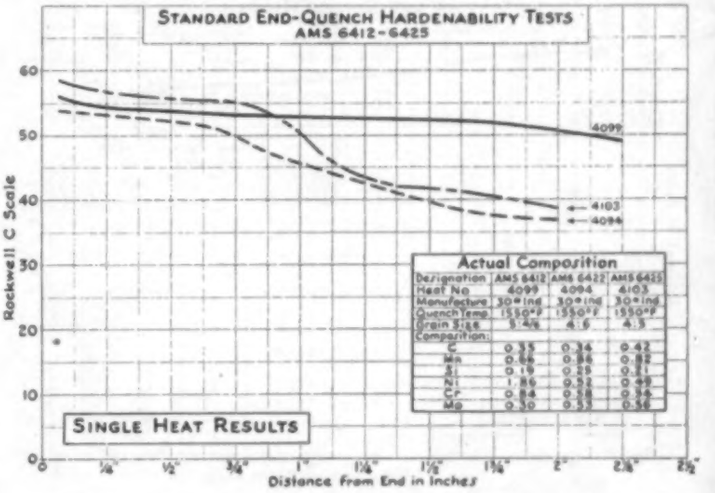
Actual Composition					
Designation	NE 8630	C	0.33	Si	0.28
Manufacture	E F	Mn	0.87	Ni	0.48
Quench Temp	1575°F	P	0.011	Cr	0.50
Grain Size	7-8	S	0.010	Mo	0.20

Standard End-Quench Hardenability Tests
AMS 6290-6274



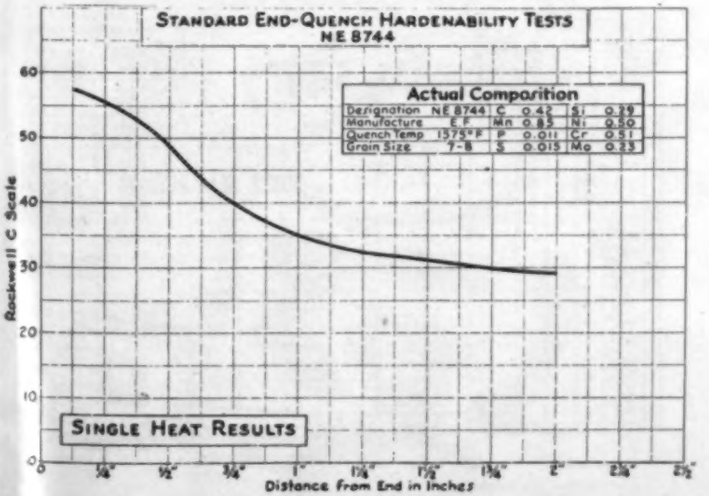
Actual Composition					
Designation	AMS 6290	AMS 6270	AMS 6270	AMS 6270	AMS 6274
Heat No.	4098	4087	4101	4088	4091
Manufacture	30# Ind	30# Ind	30# Ind	30# Ind	30# Ind
Quench Temp	1600°F	1600°F	1600°F	1600°F	1600°F
Grain Size	4	4-3/8	5-3/8	3-7/8	4-3/8
Dyrc. Hard	35-37	25-27	25-27	34-36	38-39
Composition:					
C	0.16	0.13	0.14	0.17	0.20
Mn	0.47	0.68*	0.62*	0.72	0.75
Si	0.20	0.18	0.26	0.19	0.24
Ni	1.79	0.49	0.51	0.47	0.42
Cr	0.04	0.94*	0.45	0.57	0.58
Mo	0.19	0.27	0.25	0.24	0.27

Standard End-Quench Hardenability Tests
AMS 6412-6425



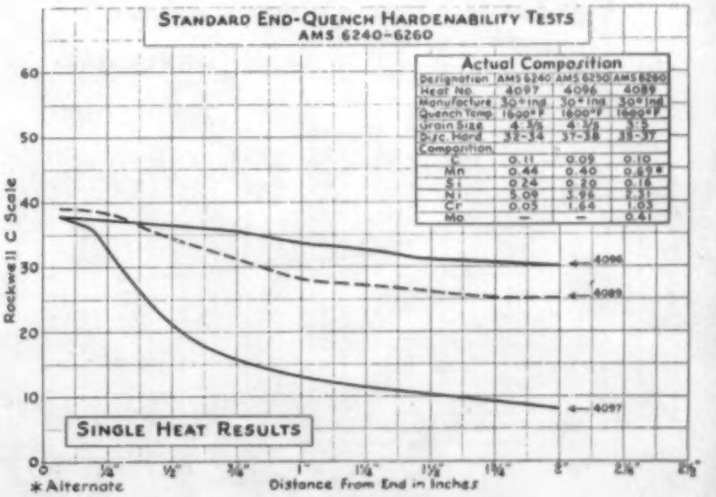
Actual Composition			
Designation	AMS 6412	AMS 6422	AMS 6425
Heat No.	4099	4094	4103
Manufacture	30# Ind	30# Ind	30# Ind
Quench Temp	1550°F	1550°F	1550°F
Grain Size	5-4/8	4-5	4-5
Composition:			
C	0.35	0.34	0.42
Mn	0.66	0.86	0.82
Si	0.19	0.25	0.21
Ni	1.86	0.52	0.49
Cr	0.84	0.58	0.96
Mo	0.30	0.53	0.56

Standard End-Quench Hardenability Tests
NE 8744



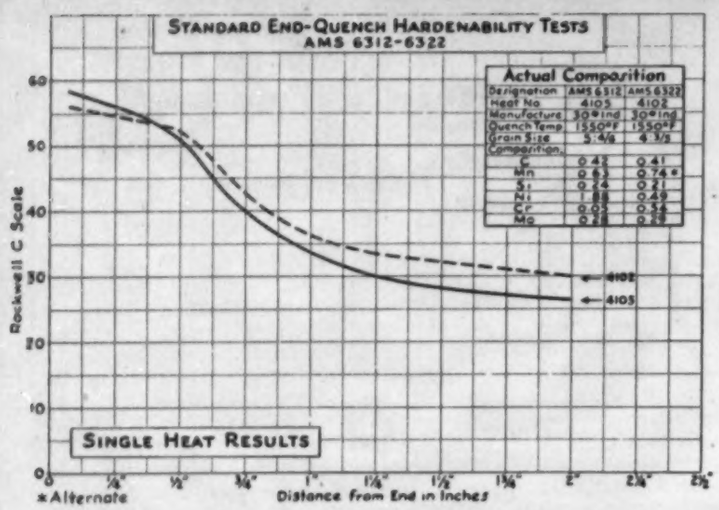
Actual Composition					
Designation	NE 8744	C	0.42	Si	0.29
Manufacture	E F	Mn	0.85	Ni	0.50
Quench Temp	1575°F	P	0.011	Cr	0.51
Grain Size	7-8	S	0.015	Mo	0.23

Standard End-Quench Hardenability Tests
AMS 6240-6260



Actual Composition			
Designation	AMS 6240	AMS 6250	AMS 6260
Heat No.	4097	4096	4089
Manufacture	30# Ind	30# Ind	30# Ind
Quench Temp	1600°F	1600°F	1600°F
Grain Size	4-3/8	4-3/8	3-5
Dyrc. Hard	32-34	37-38	35-37
Composition:			
C	0.11	0.09	0.10
Mn	0.44	0.40	0.63*
Si	0.24	0.20	0.16
Ni	3.09	1.96	2.31
Cr	0.05	1.64	1.03
Mo	—	—	0.41

Standard End-Quench Hardenability Tests
AMS 6312-6322



Actual Composition		
Designation	AMS 6312	AMS 6322
Heat No.	4105	4102
Manufacture	30" Ind	30" Ind
Quench Temp	1550°F	1550°F
Grain Size	5-6/8	4-3/8
Composition		
C	0.42	0.41
Mn	0.83	0.74*
Si	0.24	0.21
Ni	1.88	0.49
Cr	0.92	0.58
Mo	0.28	0.29

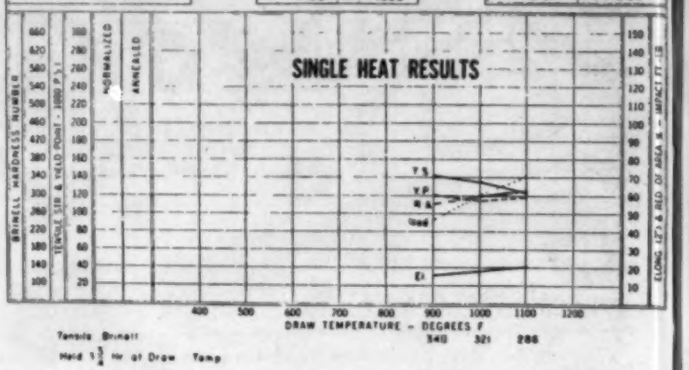
*Alternate

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL		
QUENCH	1525	OIL
TEST PIECE TREATED IN 3" Round		

N E 8739
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

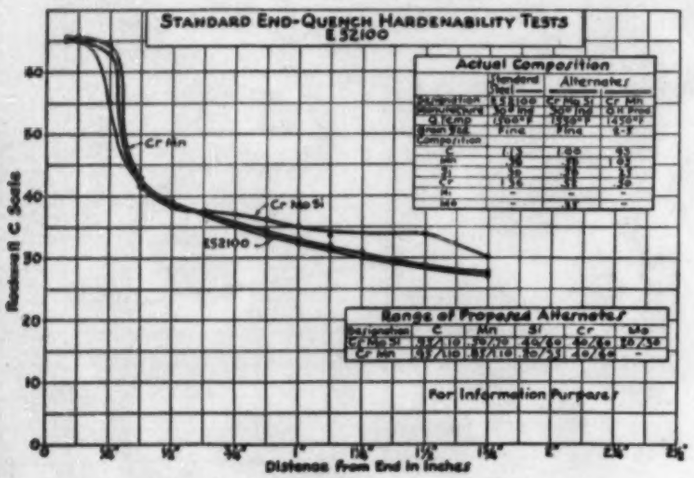
CRITICAL POINTS °F			
Ac1	1350	Ar1	1180
Ac3	1450	Ar3	1300

CHEMICAL SPECIFICATIONS	
C % 0.41	Ni % 0.46
Mn % 0.86	Cr % 0.47
P % 0.015	
S % 0.019	
Si % 0.31	Mo % 0.26



Tensile Brinell 340 321 286
Hold 1¾ Hr at Draw Temp

Standard End-Quench Hardenability Tests
E 52100



Actual Composition	Standard Steel	Alternates	
Designation	E 52100	Cr Mo Si	Cr Mn
Heat No.	30" Ind	30" Ind	Oil Prod
Quench Temp	1550°F	1550°F	1450°F
Grain Size	Fine	Fine	6-8
Composition			
C	1.03	1.00	.93
Mn	.36	.38	1.01
Si	.28	.28	.27
Cr	1.36	.91	.90
Ni	-	-	-
Mo	-	.38	-

Range of Proposed Alternates				
Designation	C	Mn	Si	Cr	Mo
Cr Mo Si	.97/1.10	.35/.75	.40/.60	.86/.96	.30/.50
Cr Mn	.97/1.10	.87/1.10	.20/.35	.40/.60	-

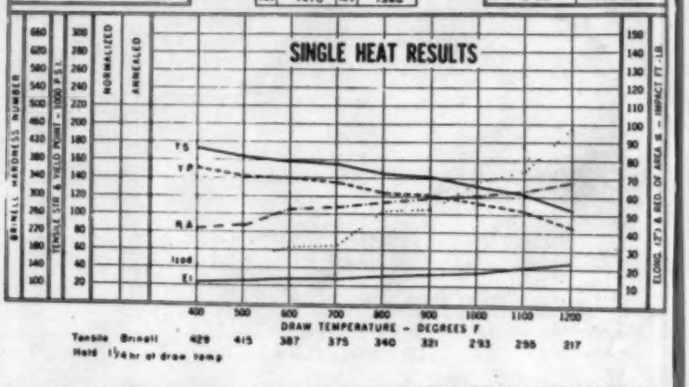
For Information Purposes

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	Air
ANNEAL		
QUENCH	1550	Oil
TEST PIECE TREATED IN 1" Round		

N E 8630
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

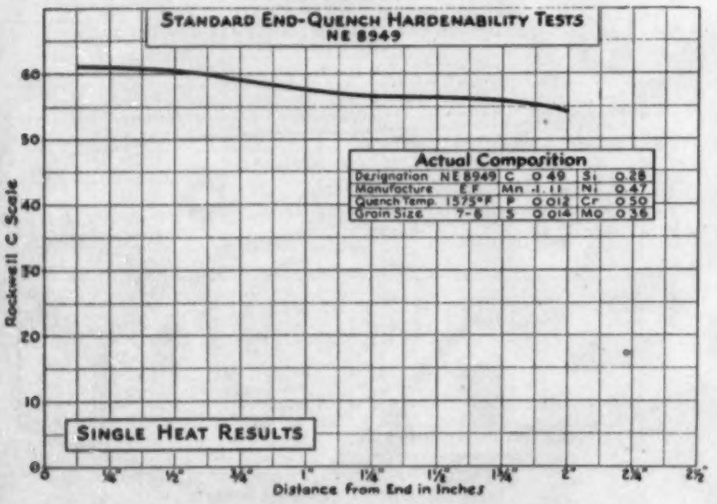
CRITICAL POINTS °F			
Ac1	1350	Ar1	1220
Ac3	1470	Ar3	1360

CHEMICAL SPECIFICATIONS	
C % 0.304	Ni % 0.42
Mn % 0.80	Cr % 0.49
P % 0.014	
S % 0.015	
Si % 0.25	Mo % 0.22



Tensile Brinell 429 415 387 375 340 321 293 295 217
Hold 1¼ hr at draw temp

Standard End-Quench Hardenability Tests
NE 8949



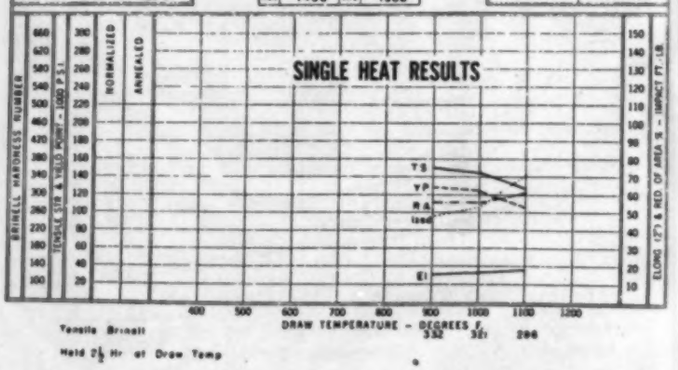
Actual Composition			
Designation	NE 8949	C	0.49
Manufacture	E F	Mn	1.11
Quench Temp.	1575°F	P	0.012
Grain Size	7-8	S	0.014
		Si	0.28
		Ni	0.47
		Cr	0.50
		Mo	0.35

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL		
QUENCH	1525	OIL
TEST PIECE TREATED IN 2" Round		

N E 8739
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

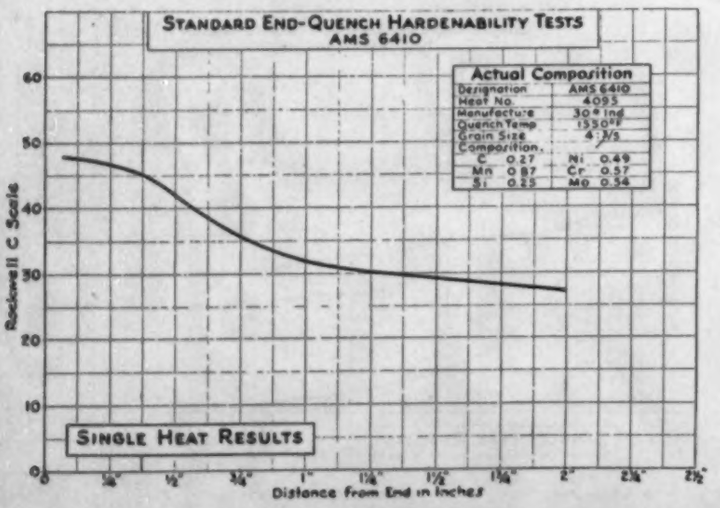
CRITICAL POINTS °F			
Ac1	1350	Ar1	1180
Ac3	1450	Ar3	1300

CHEMICAL SPECIFICATIONS	
C % 0.41	Ni % 0.46
Mn % 0.86	Cr % 0.47
P % 0.015	
S % 0.019	
Si % 0.31	Mo % 0.26



Tensile Brinell 532 521 296
Hold 2½ Hr at Draw Temp

Standard End-Quench Hardenability Tests
AMS 6410



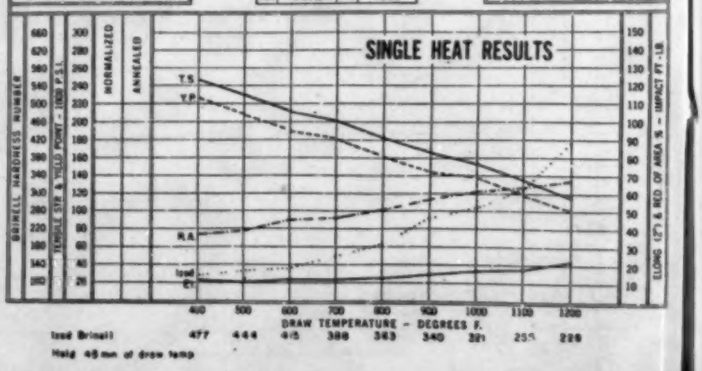
Actual Composition	
Designation	AMS 6410
Heat No.	4095
Manufacture	30" Ind
Quench Temp	1550°F
Grain Size	4-3/8
Composition	
C	0.27
Mn	0.87
Si	0.25
Ni	0.49
Cr	0.57
Mo	0.34

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	Air
ANNEAL		
QUENCH	1550	Oil
TEST PIECE TREATED IN 0.530" Round		

N E 8630
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

CRITICAL POINTS °F			
Ac1	1350	Ar1	1220
Ac3	1470	Ar3	1360

CHEMICAL SPECIFICATIONS	
C % 0.304	Ni % 0.42
Mn % 0.80	Cr % 0.49
P % 0.014	
S % 0.015	
Si % 0.25	Mo % 0.22



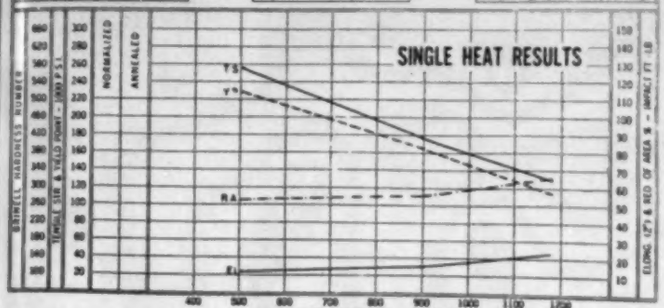
Izod Brinell 477 444 415 388 363 340 321 255 229
Hold 45 min at draw temp

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL	-	
QUENCH	1500	OIL
TEST PIECE TREATED in 1" Round		

Estimated Properties
N E 8739
Ni-Cr-Mo Wrought Steel
Grain Size 8/7

CRITICAL POINTS °F			
Ac1		Ar1	
Ac3		Ar3	

CHEMICAL SPECIFICATIONS			
C %	0.37	Ni %	0.54
Mn %	0.91	Cr %	0.51
P %			
S %			
Si %	0.30	Mo %	0.25



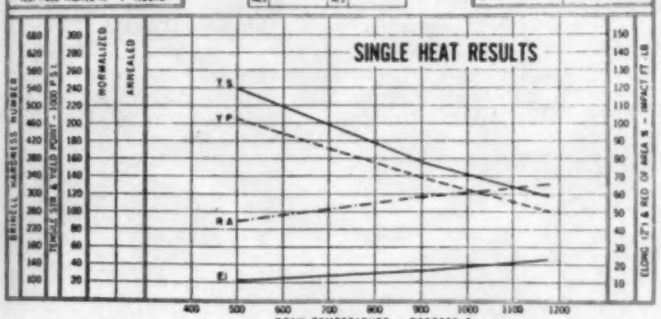
Brinell H N	450		357		269			
Hot Rolled 1½" Rd	TS 126,500	YP 89,000	El 2"-16.7	RA 48.1	BHN 255			
Normalized 1" "	" 127,500	" 84,600	" 18.2	" 45.4	" 255			

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1700	AIR
ANNEAL		
QUENCH	1525	OIL
TEST PIECE TREATED in 1" Round		

Estimated Properties
N E 8630
Ni-Cr-Mo Wrought Steel
Grain Size 8-7

CRITICAL POINTS °F			
Ac1		Ar1	
Ac3		Ar3	

CHEMICAL SPECIFICATIONS			
C %	0.335	Ni %	0.54
Mn %	0.88	Cr %	0.51
P %			
S %			
Si %	0.31	Mo %	0.22



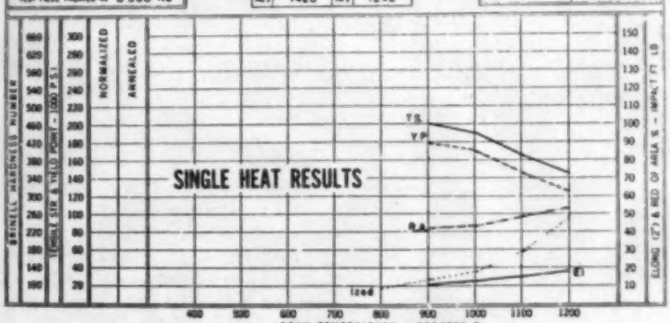
Brinell H N	430		311		241			
Hot Rolled 1¼" Rd	TS 121,000	YP 85,800	El 2"-18	RA 50.4	BHN 248			
Normalized 1" "	" 112,000	" 88,500	" 18.7	" 42.3	" 229			

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL		
QUENCH	1500	OIL
TEST PIECE TREATED in 0.530" Rd		

N E 8749
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

CRITICAL POINTS °F			
Ac1	1340	Ar1	1210
Ac3	1420	Ar3	1240

CHEMICAL SPECIFICATIONS			
C %	0.546	Ni %	0.46
Mn %	0.83	Cr %	0.52
P %	0.015		
S %	0.014		
Si %	0.23	Mo %	0.27



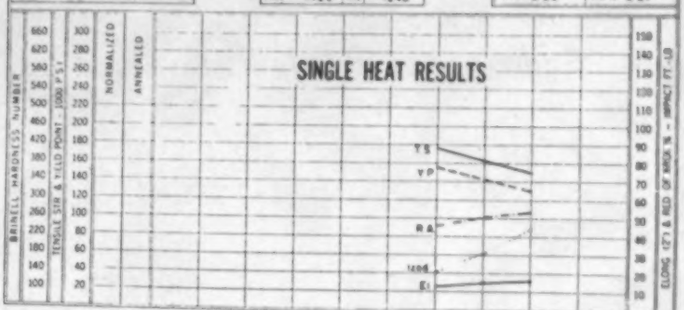
Tensile Brinell	444	415	401	363	332
Hold 45 Min at Draw Temp					

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	Air
ANNEAL		
QUENCH	1500	Oil
TEST PIECE TREATED in 4" Round		

N E 8749
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

CRITICAL POINTS °F			
Ac1	1340	Ar1	1210
Ac3	1420	Ar3	1240

CHEMICAL SPECIFICATIONS			
C %	0.546	Ni %	0.46
Mn %	0.83	Cr %	0.52
P %	0.015		
S %	0.014		
Si %	0.23	Mo %	0.27



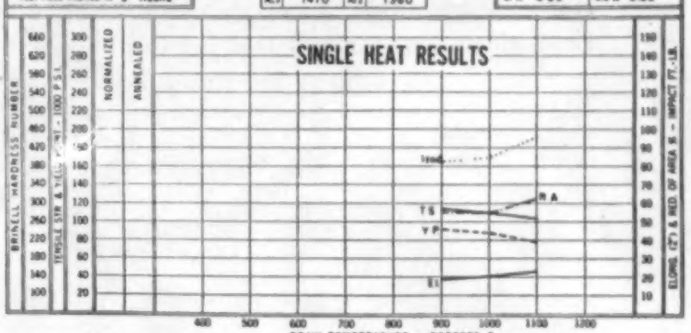
Tensile Brinell	415	387	340		
Held 4 Hr at draw temp					

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL		
QUENCH	1550	OIL
TEST PIECE TREATED in 3" Round		

N E 8630
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

CRITICAL POINTS °F			
Ac1	1350	Ar1	1220
Ac3	1470	Ar3	1360

CHEMICAL SPECIFICATIONS			
C %	0.304	Ni %	0.42
Mn %	0.80	Cr %	0.49
P %	0.014		
S %	0.013		
Si %	0.25	Mo %	0.22



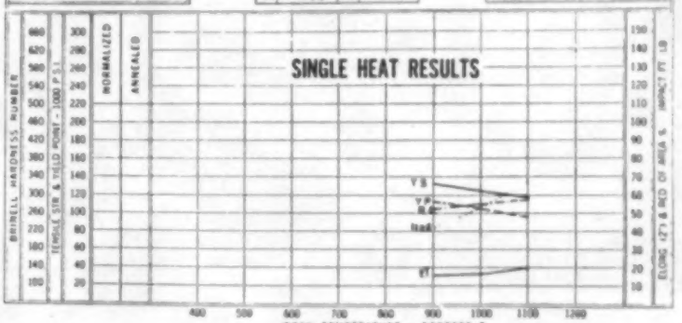
Tensile Brinell	241	235	217		
Held 4 Hr at Draw Temp					

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL		
QUENCH	1525	OIL
TEST PIECE TREATED in 5" Round		

N E 8739
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

CRITICAL POINTS °F			
Ac1	1350	Ar1	1180
Ac3	1450	Ar3	1300

CHEMICAL SPECIFICATIONS			
C %	0.41	Ni %	0.46
Mn %	0.86	Cr %	0.47
P %	0.015		
S %	0.019		
Si %	0.31	Mo %	0.26



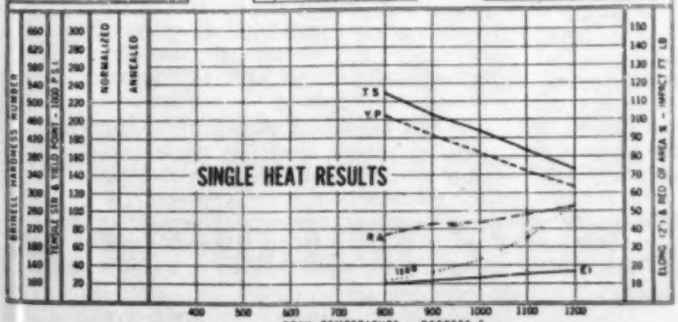
Tensile Brinell	521	288	255		
Held 4 Hr at Draw Temp					

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	Air
ANNEAL		
QUENCH	1500	Oil
TEST PIECE TREATED in 1" Round		

N E 8749
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

CRITICAL POINTS °F			
Ac1	1340	Ar1	1210
Ac3	1420	Ar3	1240

CHEMICAL SPECIFICATIONS			
C %	0.546	Ni %	0.46
Mn %	0.83	Cr %	0.52
P %	0.015		
S %	0.014		
Si %	0.23	Mo %	0.27



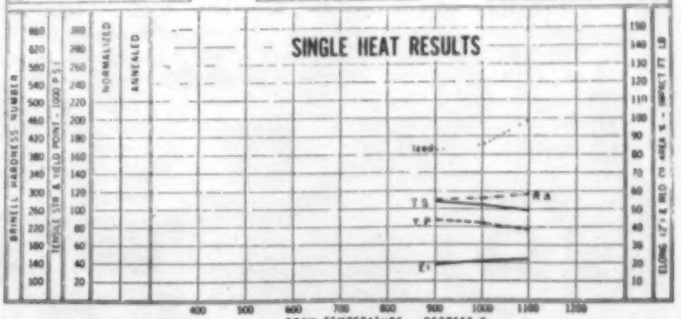
Tensile Brinell	444	415	387	351	311
Held ½ Hr at Draw Temp					

RECOMMENDED PRACTICE		
OPERATION	TEMP °F	COOL
FORGE		
NORMALIZE	1650	AIR
ANNEAL		
QUENCH	1550	OIL
TEST PIECE TREATED in 5" Round		

N E 8630
Ni-Cr-Mo Wrought Steel
Grain Size 7-8

CRITICAL POINTS °F			
Ac1	1350	Ar1	1220
Ac3	1470	Ar3	1360

CHEMICAL SPECIFICATIONS			
C %	0.304	Ni %	0.42
Mn %	0.80	Cr %	0.49
P %	0.014		
S %	0.015		
Si %	0.25	Mo %	0.22



Tensile Brinell	241	228	196		
Held at Draw Temp 4 Hr					

Some of the problems involved in . . . .

CONVERTING THE PLATING INDUSTRY

Here a man close to the electroplating and finishing industries delves deeply into the problems involved in converting their facilities for maximum utilization in the war effort. He offers suggestions for small plants—suggestions that if followed may keep them operating through the crucial months ahead

AT PRESENT, the metal finishing industry, like many others, finds itself in a transition period. Due to the war, the normal flow of everything from cravat clips to automobiles is being discontinued. Materials for war must be and are being substituted. Most of the large plants engaged in manufacturing automobiles, refrigerators, and the like are already in war work because of importance of their large and complete manufacturing facilities.

However, smaller plants often have difficulties in adjusting themselves to the production of war equipment. This may be due to several reasons. First, the metal finishing plant, in many cases, is separated from a complete manufacturing unit. A completely finished product is not produced on the premises. Second, the finishing plant is, comparatively speaking, a small unit. Third, the importance and the size of the industry is underrated. Fourth, the work produced, many times, is inferior.

Fifth, the possible accomplishments are not generally known. Sixth, the importance of the product (the protective coating) is not generally appreciated. And seventh, what the average engineer knows about this industry is a minus quantity.

All these factors added together make this important industry a step child to the war manufacturing effort. This should not be. In discussing the difficulties listed above, the writer will endeavor to be fair, practical and specific.

It is true that the industry is, in many cases, an independent unit. This should be no serious handicap, however, for is it not also true that the major industries are subcontracting a large percentage of their work? For instance, an instrument manufacturer subcontracts for certain gear assemblies, zinc base diecast housings, and optical goods. *Why can't the plating, lacquering, polishing, etching, etc., of a part be subcontracted as well?*

By DR. C. B. F. YOUNG
Electrometallurgist
Flushing, Long Island, N. Y.

In many cases the finishing plant is small, amounting in some instances to a "hole in the wall'. However, I have seen production work done in such places that would amaze an efficiency expert. It is possible to tie several of these smaller units together so they can contract for a large amount of work at one time. The executives of some small finishing establishments may know little about specification finishes, but that can be remedied as will be shown in discussion of the fourth point above.

The importance and size of the industry should not be underestimated. Generally speaking, it is divided into two parts. One group is represented by those plants doing only finishing work and known as "contract shops". The second group consists of those plants where the finishing shop is a division of a complete manufacturing setup. Data for the first group can be obtained. However, figures for the second group are hard to produce.

The Census of Manufacturers, Electroplating and Polishing, 1939, put out by the Department of Commerce, lists 643 establishments doing plating and polishing in the United States. This excludes those places doing less than $5000 worth per year. Yet 8200 wage earners and 997 salaried executives earned wages amounting to some $9,383,000. The cost of material was $7,300,000, while the value of the products was $28,168,000. The value added by manufacturing, less the cost of materials, was $20,868,000. This, let me stress, was only a portion of contract shop output as only plating and polishing items were included, and since 1939 the business has enlarged.

It has been estimated that contract shops do 10 to 20 per cent of the entire electroplating business. Let us take 10 per cent, as our figures include only a part of the finishing field. The wages for the whole industry then become $93,830,000 and cost of materials is $73,900,000, while the value of the product equals $281,680,000. This does not include the small units doing less than $5000 worth of business per year. From the above one can readily see that the industry is of fair size.

In the city of New York alone, there are 175 contract plating shops with 225 in the metropolitan area. In the United States there are perhaps 800 contract shops, while there are in the neighborhood of 3000 to 4000 plants which have plating departments.

Needless to say, if the surface is protected from corrosion and abrasion by a protective coating, the added operations are well worth while. "Save the surface and you save all" is a slogan that contains much truth for if the surface rusts and interferes with the proper functioning of the mechanism, the unit is no good. Camouflage is another reason for finishing the surface.

It has been said, especially of the smaller plants, that the work produced often is inferior or not up to specification. The reason for this is that the owner has never had to produce specification finishes. Heretofore, a good nickel or lacquer

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Courtesy U. S. Army Signal Corps

finish was requested. The plater, for instance, never had to produce a nickel plate 0.001-inch thick with not more than ten pores per square inch. The large plants are doing specification work due to technical aid which they can hire. The smaller units can also do this if technical aid is available. This can be arranged by organizing the smaller men into area groups and appointing a technical aid to each group.

It is believed that such technical aid can be obtained on a free or very liberal basis. This help can be secured by the co-operation of the manufacturer's organization, technical societies in the field and of the schools. A good example of each of the above is the Master Electroplaters' Association of New York, the American Electroplaters' Society, which incidentally has 32 branches, and the Institute of Electrochemistry and Metallurgy of New York. Such an organization could be completed in short order. Organize the plants, show them how to do the job and good work will be forthcoming.

Due to the lack of co-operation of the smaller units and the submersion of the finishing departments of the larger manufacturers, the accomplishments of the industry are not generally known. For instance, the life of the finish of the car (and therefore of the car) is at least five years. A few years ago, a driver did well if the bumper was protected from rust for a year. In fact, a few years ago shipping automobile parts by rail was a problem because the units rusted before they reached their destination. Count the cars on the road today which were made prior to 1937. There are many of them.

The electroplating industry is a peculiar one and has been developed in the northeastern and central part of the United States. Partly due to the aviation industry, much anodizing and plating is now being done on the west coast. For this and other reasons, many engineers know very little about the field. This had led to cumbersome and foolish specifications as well as excessive rejections. However, that is to be expected in an expanding industry. This can and will be overcome by obtaining the advice of competent authorities in the field.

And now for an attempt to say how the finishing industry can be brought in the war production plan.

—Do not build large plating plants as a part of any new plants, provided plating facilities are nearby, because this would take new equipment off the market and force present machinery and labor in commercial shops to stand still.

—Subcontract the plating work under specification to plating plants

(*Please turn to Page* 111)

TABLE I—Operations Involved in Finishing of Metallic Surfaces; Electro-plating Shop Facilities

I—Polishing and Buffing
- —Snagging
- —Grinding
- —Emerying
- —Cutting down
- —Sand bobbing
- —Grease buffing
- —Dry wheeling
- —Felt Wheeling
- —Wood wheeling
- —Lapping
- —Polishing
- —Glossing

II—Pickling
- A. Dissolving surface chemically
  - —Sulphuric acid
  - —Hydrochloric acid
- B. Electrochemical
  - —Bullard-Dunn process

III—Barrel Burnishing
- A. Ball burnishing, metals or plastics
  - —Wet
  - —Dry
- B. Cutting down
  - —Pumice and kerosene
  - —Pumice and water
- C. Drying
  - —Sawdust
  - —Sawdust and hot air
- D. Dry tubbing
  - —Sawdust

IV—Cutting Down and Polishing by Barrel
- —Abrasive carried on wood, leather chips, etc.

V—Electrolytic Polishing
- —Ferrous
- —Nonferrous

VI—Soldering
- —Lead alloys
- —Tin alloys
- —Silver alloys
- —Gold alloys

VII—Bright Dipping
- A. Fire dip pickling
  - —Sulphuric acid
  - —Nitric acid
- B. Black boil
  - —Sulphuric acid
  - —Nitric acid
- C. Bright dip
  - —Nitric acid
  - —Sulphuric acid
  - —Hydrochloric acid

VIII—Scratch Brushing
- —Brass wheel
- —Bronze wheel
- —Nickel-copper wheel
- —Steel crimp wheel
- —Straight steel wire wheels
- —Removing burned solder

IX—Cleaning of Metals
- A. Aqueous
  - 1. Soaking
  - 2. Electrocleaning
    - —Anodic
    - —Cathodic
  - 3. Chemical rinses
- B. Non-aqueous
  - 1. Chlorinated hydrocarbons
    - —Vapor degreasing
    - —Liquid degreasing
  - 2. Other organic solvents
- C. Mechanical
  - 1. Sand blasting
  - 2. Steel blasting
  - 3. Centrifugal cleaning

X—Plating Metals
- A. Nickel
  - —Bright
  - —Ordinary
- B. Copper
  - —Acid
  - —Cyanide
- C. Cadmium
  - —Bright
  - —Ordinary
- D. Zinc
  - —Bright
  - —Ordinary
- E. Chromium
- F. Silver
- G. Tin
- H. Lead
- I. Cobalt
- J. Gold
- K. Iron
- L. Rhodium
- M. Palladium
- N. Platinum
- O. Indium

XI—Plating Alloys
- —Brass
- —Bronze
- —White brass
- —Silver-cadmium
- —Cadmium-zinc
- —Gold-silver
- —Gold-silver-copper
- —Gold-cadmium
- —Gold-copper-nickel
- —Gold-zinc
- —Gold-cadmium-nickel
- —Gold-silver-nickel
- —Cobalt-nickel
- —Black nickel
- —Silver-copper
- —Silver-copper-nickel
- —Tin-copper
- —Tin-copper-cadmium
- —Tin-copper-zinc

XII—Anodizing and Coloring
- A. Aluminum
  - —Chromic acid
  - —Sulphuric acid
- B. Magnesium

XIII—Methods Used To Accomplish XI and XII
- —Still plating
- —Barrel plating
- —Semi-automatic plating
- —Full automatic plating

XIV—Non-Metallic Inorganic Coatings
- —Phosphate coatings
- —Oxide coatings on ferrous materials
- —Oxide coatings on nonferrous materials
- —Sulphide coatings on nonferrous materials

XV—Organic Films
- —Lacquers
- —Enamels
- —Varnishes
- —Paints
- —Stop-off paints and lacquers

XVI—Inorganic Non-Metallic Coatings
- —Porcelain enamels

XVII—Metal and Alloy Coloring
- —Black
- —Brown
- —Blue
- —Yellow
- —Orange
- —Red
- —White

XVIII—Miscellaneous
- —Heat treating of electrodeposits (diffusion)
- —Engine turning
- —Chasing
- —Hand burnishing
- —Lathe burnishing
- —Engraving
- —Metal etching

Personnel and labor to operate above and also to do large amounts of "stringing up," "unstringing" and assembling.

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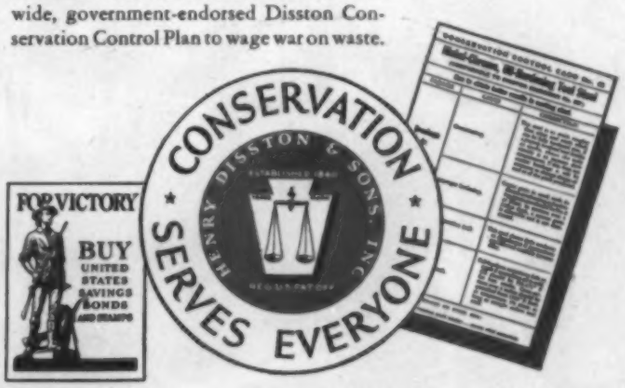


TRAVEL FRAME

. . . . for automatic welding head is designed with several unique features which greatly increase flexibility of the unit, speed welding operations, allow control of penetration by tilting work

TYPICAL of the arrangements that can be developed to apply automatic welding heads to production work is an arc-welded frame and travel arm designed and built by Link-Belt Co., 307 North Michigan avenue, Chicago. It carries an automatic welding head to make long straight seams in a variety of angles and positions. A general view of the apparatus is seen in Fig. 1.

The supporting frame of the mechanism is made of I-beams and is 25 feet long, 20 feet wide and 15 feet high. Travel arm itself, seen in the middle of the picture, is 45 feet long, extending beyond the frame on both ends. The electronic Tornado automatic head is supplied with current from two 400-ampere generators made by Lincoln Electric Co., 12818 Coit road, Cleveland. The head is seen just behind the trolley which supports the right end of the travel arm. Immediately to the left of this trolley is the reel of the automatic welding head from which is fed the welding wire. The carbon electrode itself is visible in the center of the basket-like arrangement below the travel arm.

The travel arm rides on trolleys constructed of I-beams. Trolleys permit positioning the unit crosswise for welding parallel seams without moving the work. Trolleys have trucks which ride on the heavy I-beams forming the cross tracks. At both ends of these cross tracks are wheels and trucks designed to allow vertical movement of the cross track rail at the corner posts as shown in Fig. 2. Bail seen hanging from the lifting cable in Fig. 2 supports one end of a cross track rail. By means of these bails and the attached cables, both cross track rails and trolleys are raised or lowered simultaneously by a small electric hoist to which the cables are reeved. Or the travel arm can be thrown out of level to permit welding at angles up to 5 degrees up-hill by lifting only one of the two cross rails. This is helpful in getting the pool of molten weld metal behind the arc for greater penetration on certain work.

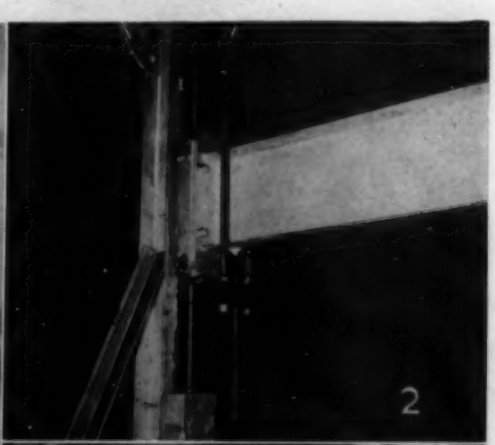
Rocker joint necessary on the trolley to permit this out-of-level adjustment of the travel arm and to prevent travel arm from tipping crosswise is shown in Fig. 3. A curved piece of steel is arc welded to the travel arm and a curved segment attached to the end of it as shown. A similar segment is fastened to the curved shoe which is arc welded to the triangular support member. This latter piece is joined to the trolley itself, which is fabricated from I-beam sections with gusset plates arc welded over the joints. The actual weight of the travel arm is supported at the bottom where a block rests on the trolley. A braking arrangement holds the trolley rigidly in place to prevent unintentional sidewise movement during welding operations.

A light jib crane made of pipe supports the power and control cables and follows the head to keep the cable off the floor. Cooling water is circulated by a small motor-driven pump.

Fig. 1—Travel frame for automatic welding head, featuring separately moveable cross tracks. These permit travel arm on which automatic head rides to be tilted. Cross tracks are raised and lowered through cable hookup to an electric hoist seen mounted at top of jib crane just under center of nearest cross track

Fig. 2—Closeup of vertical track and trolley used to permit vertical adjustment of the cross tracks. Note screw at bottom of cable bail for leveling cross track

Fig. 3—Closeup of arrangement utilized by trolleys to support travel arm but to allow tilting of the arm



American Production is Speeding the Day of Victory— And Century Electric Motors Aid Production

Machine Tools Powered by CENTURY MOTORS Produce Shells and Munitions of War

Photo by U. S. Army Signal Corps

Freedom from vibration makes possible closer tolerances

● It is not by accident that so many machine tools engaged in the precision machining of shell casings and other munitions are powered by Century Motors.

For here is where extreme accuracy is essential above all; tolerances must be held to the closest of limits if shell and gun are to perform effectively and accurately.

Century Motors' remarkable freedom from vibration has proven extremely valuable in the operation of machine tools where speed, accuracy, and precision — all three — are of vital importance. And Century Motors can keep up the 3-shift work day pace without layoffs, vacations, or rest periods.

In thousands of industrial plants throughout all industry, you'll find Century Motors on the job, helping to produce the sinews of War as well as the essentials of our civilian life.

If you have a motor problem involving both speed and precision in production, call in your nearest Century Sales Engineer without delay.

Century MOTORS

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Missouri
Offices and Stock Points in Principal Cities

271

One of the Largest Exclusive Motor and Generator Manufacturers in the World

Your contract should protect you against costs higher than original estimates, for often it is extremely difficult to accurately determine costs of such items as this die for punching out electrical sheets to make laminations for small electric motors. Because of the painstaking care and accuracy in making it, this die will produce more than 4,000,000 laminations. But it takes 800 man-hours—one man's time for 20 weeks—to make it. Many of the 51 parts are finished to a 0.0001-inch. Westinghouse Electric & Mfg. Co. photo

Drafting and Operating Under Government Contracts

Manufacturing for the government agencies involves many special problems that should receive due consideration if your contract is to protect you against loss. Here some of the more important points are detailed

(*Section* I)

THE DRAFTING of your contract may determine your profits and losses. Your job on the production line is tied to your understanding of its terms. Do not take the attitude that the contract is merely a necessary formality. It is the book of rules which defines your duties and establishes your rights.

Analyze every clause to determine its effect on your operations. Where the contract affects you adversely, request a modification. If you have a special problem, request the insertion of an additional clause to meet that problem. Consent to the change may be given if you have a good reason and if it is not contrary to the government's interest or to statute. Remember that the time to speak is at the time of executing the contract. Any changes made later will probably require additional value such as earlier delivery, additional work, etc. Even if your contracting officer desires to help you, he lacks authority to make subsequent changes without such consideration.

Cost Items Peculiar to War Contracts: A government war contract is not all gravy; cost factors may run much higher than in peace-time production. Don't bid until you *know* that all unusual factors have been considered.

Where you produce partly for the government and partly for civilian markets, the problem becomes particularly complex. For example, where your civilian production does not require the same high precision standards and close tolerances of government work, you must use care to charge the government work with the extra overhead and inspection costs. Similarly, capacity production may cause greater plant and machine depreciation. Failure to calculate these factors may lead to a concealed loss on your government contracts and a concealed absorption of the loss by your civilian contracts.

Recommendation: In bidding on war contracts, keep your eyes peeled for these profit swallowers:

—Increased cost due to sudden increase in volume.

—Higher cost due to increased number of shifts per day.

—Accelerated depreciation due to speed-up demanded by the war emergency. Often bonuses for performances are not adequate to take care of accelerated depreciation.

—Obsolescence of machinery and blueprints due to major changes in specifications.

—High cost of subcontracting and the maintaining of special skilled labor.

—Additional traveling by executives, engineers and workmen.

—The more complicated and vigorous system of supervision and inspection peculiar to government work.

—Increased paperwork in getting preference rating under the priorities system, filing inventory reports, etc.

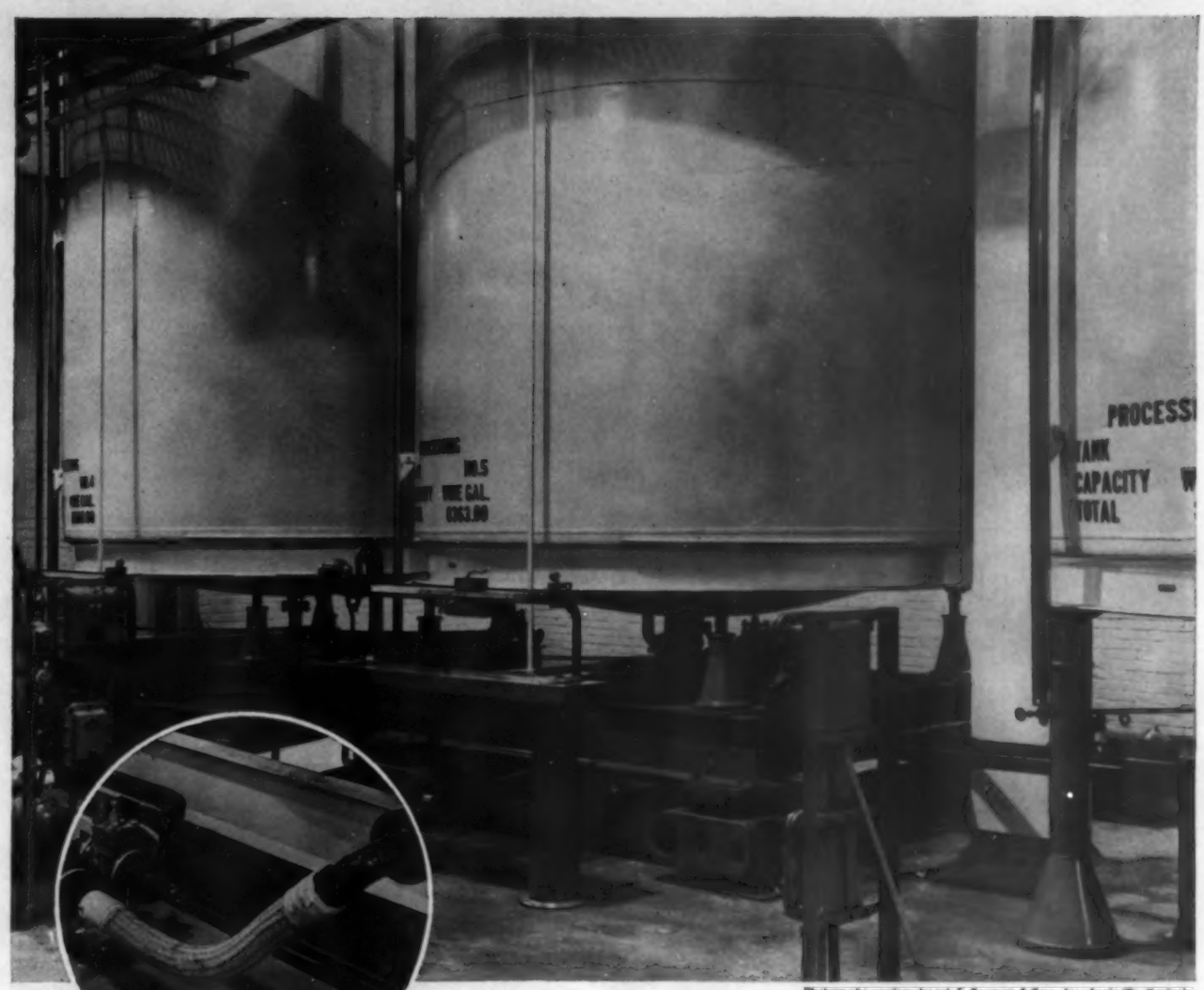
—Scouting for scarce materials and scarce skilled labor.

—Providing housing facilities for additional employes.

—Much closer tolerance may be required on machinery, resulting in a higher percentage of spoiled and rejected work.

—Extra paperwork in connection with the government price-control machinery.

From Analysis No. 20, "Producing for War", by the Research Institute of America, 292 Madison avenue, New York, a booklet, incidentally, that should be carefully studied by every manufacturer in war production or contemplating war production work.



Photographs courtesy Joseph E. Seagram & Sons, Inc., Louisville, Kentucky

There's a twist to measuring spirits in 8,000 gallon "jiggers"

American Seamless conveys alcohol safely . . . provides compensating flexibility . . . for delicate task on scale tanks at Seagram's Louisville Distillery.

The giant distillery business of this country has undergone a "conversion" too . . . making alcohol for smokeless powder production. And in this, as in other vital war industries, dependable American Seamless Flexible Metal Tubing is helping to do a better job.

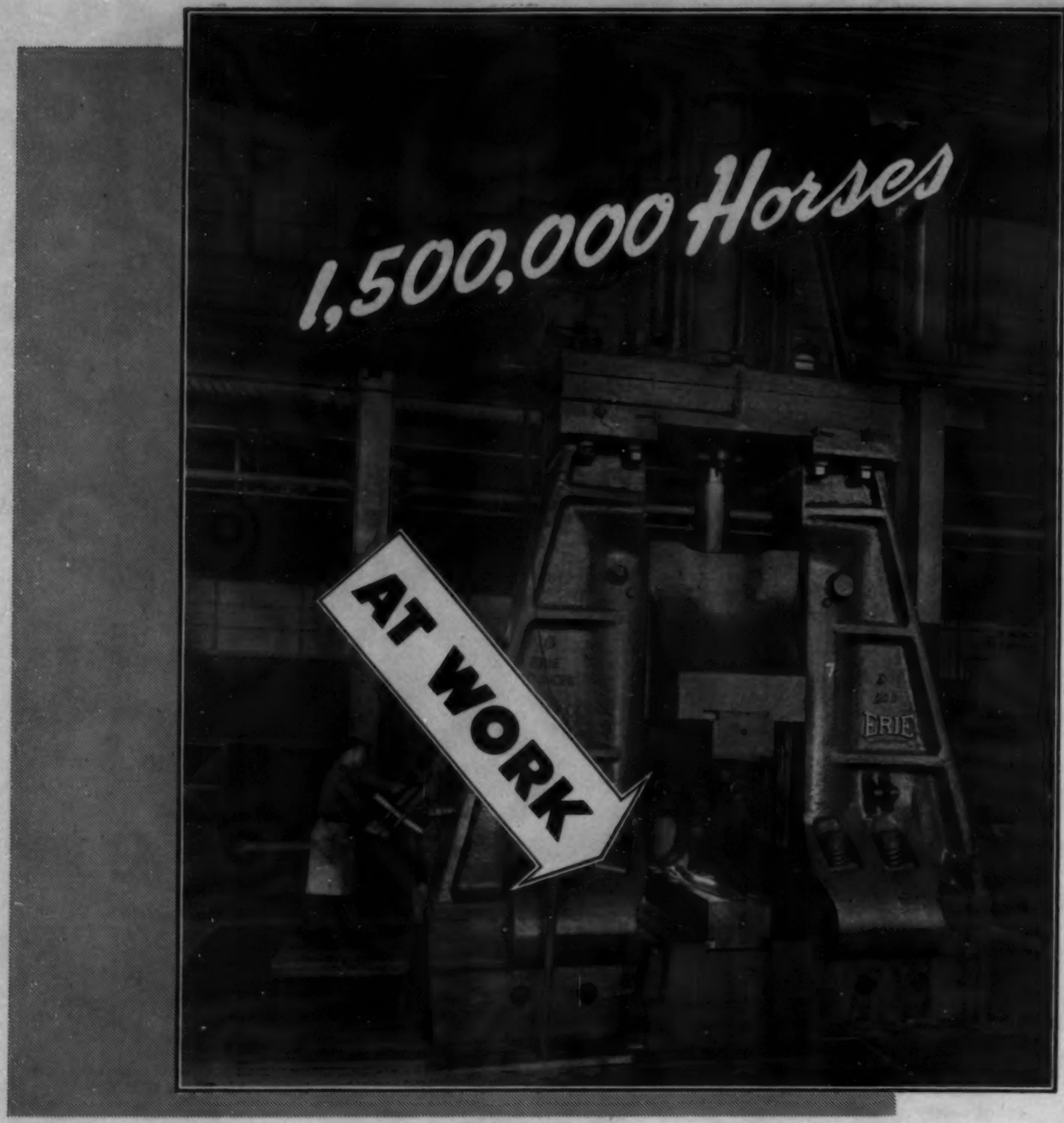
In this case, American Seamless, with its "garden hose" flexibility, compensates for the vertical twist that takes place with weight changes on these large "scale tanks". At the same time, its tinned bronze interior provides non-toxic contact with the alcohol.

As always American Seamless and other products of American Metal Hose are serving wherever industry needs dependable flexible connectors for conveying steam, air, oil and other liquids and gases. Today, of course, our entire output is serving the war program, and it will doubtless continue to do so until peace is won. 42197

American Metal Hose

ANACONDA

AMERICAN METAL HOSE BRANCH of THE AMERICAN BRASS COMPANY • General Offices: Waterbury, Conn.
Subsidiary of Anaconda Copper Mining Company • In Canada: Anaconda American Brass Ltd., New Toronto, Ontario



CONSERVATIVE calculations show that a full blow of this 35,000 lb. Erie Air Drop Hammer develops over 1,500,000 Horse Power in shaping the forging.

Erie Hammers are so designed that this tremendous energy-output is concentrated on the work with the greatest possible efficiency. The heavy ribbed box section frames of Erie Hammers hold the ram in line even with a difficult forging such as an aluminum propeller blade.

These features make possible faster production of more accurate forgings—an important requisite in today's industrial victory program.

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ERIE

ERIE BUILDS *Dependable* HAMMERS

—Bonuses paid for the movement of materials.

—Increased cost of keeping informed on technical developments and the peculiar requirements of government work.

—Cost of guarantees for performances of the delivered goods and extra work after delivery.

—Material losses from the severe metallurgical specifications of the government; cost of special testing devices, model basins, wind tunnels, crash insurance, etc.

—Increased cost due to necessary plant rearrangements and acquisition of necessary special equipment.

Letters of Intent and Short Form Contracts Expedite Procedure: The War Department's letter of intent is a peculiar type of contract used to speed up production. It (1) states that a formal contract is contemplated, (2) directs the contractor to start production at once, and (3) agrees that if the formal contract is not made by a given date the department will reimburse the contractor for his expenses up to a specified amount, taking over the equipment and materials acquired by him in reliance on the letter of intent. This technique has saved months of production time. The short form contract, likewise, is a time-saving device. It combines the invitation, bid and acceptance in one instrument.

TABLE I—Check Your Contract for These

Does it contain an escalator clause to protect you against price rises?
Are labor and material quota clauses properly worked out?
Can you get a bonus clause to reward improvements on specifications, earlier delivery dates, or lower costs?
Are you covered against delays?
Is the inclusion of borderline cost items specified in cost-plus contracts?
Look out for a recapture clause not fixing reasonable value of rented equipment and providing compensation of more than 1 per cent per month.
Does it contain provision for advance and partial payments?
Does the contract permit assignment and reassignment?
Does it contain a "waiver of set-off" clause?
Does it provide for inspection at your factory with delivery f.o.b. factory and shipment on government bill of lading?

Types of Formal Contracts: Contracts fall into two general payment classes. The first and more simple type is the lump-sum contract, which may be further subdivided into (a) contracts providing for payment on a unit produced basis and (b) those providing for payment on a complete job basis. The second and more complex type is the cost-plus-a-fixed-fee contract which, generally speaking, provides for reimbursement of the cost of the work plus a fixed fee intended to represent the contractor's profit.

The Lump-Sum Payment Basis: Lump-sum contracts may be either negotiated or let after competitive bidding. Generally, this type of contract provides for a single lump-sum payment representing the total contract price for the products or work contracted for. However the contract may provide for unit payments where the government wants the entire plant output, or an unusually large number of units is to be produced, or the construction is extensive.

By combining the unit payment type of contract with advance and progress payments, the burden of

TABLE II—Reimbursable Costs

Accident compensation expense.
Annual and sick leave.
Bidding, general selling and servicing expenses chargeable to particular contract.
Bonds: premium of performance bond on verbal authorization.
Buildings: rent of necessary space or buildings by contractor.
Bunk houses and labor camps, and equipment therefor such as beds, bed clothes, etc., *if* authorized.
Capital assets: losses from sales or exchanges of capital assets necessary to perform contract.
Changes: additional labor or material cost due to changes.
Changes: expense of changing location of job at government's direction.
Changes and extras authorized.
Clerical employes at the site of construction.
Commissaries: capital outlay and operating expenses less revenue, reimbursable.
Commissaries: expenses incident to setting up commissaries and hiring personnel therefor, such as travel, telephone, etc.
Communication expense—stationery, stamps.
Communications: cable, telegraph, telephone, etc., fees not in excess of government rates.
Concessions approved by the office of the quartermaster general: operating expense.
Contributions to local charitable and community organizations.
Corporate and general executive officers, salaries of.
Demurrage incurred without fault of the contractor.
Discounts that could not be taken.
Discounts that could not be taken due to the fault of government.
Distribution expenses such as postage, etc.
Employe rehabilitation: living expense at job, travel to home and moving family to job.
Employe welfare expense authorized in advance.
Equipment: loss arising from damage to contractor's equipment rented by government resulting from the negligence of agents of the government.
Equipment: repairs made to rented equipment.
Experimental or development work.
Extras: additional labor or material cost due to authorized instructions for additional work.
Guard and police forces.
Hiring costs.
Incentive bonuses.
Inspection and tests.
Inspection: purchase of automobile to be used for government inspector, if authorized.
Installation costs.
Insurance: actual loss or payments incurred under self-insurance plan.
Insurance authorized by contracting officer.
Insurance written by mutual company.
Insurance: payments on actuarial basis into self-insurance fund for workmen's compensation and, in states where required, unemployment insurance.
Insurance: state unemployment insurance fund payments approved by contracting officer.
Insurance: workmen's compensation.
Labor: "shop" or productive labor, and expenditures for factory labor such as services connected with supervision and inspection, clerical labor, time-keeping, packing and shipping stores supplies, employment bureaus, and tool cribs.
Lawsuits: damage recovered from contractor, not due to clear negligence.
Leave and holiday pay.
Licenses: fees for necessary local licenses and permits.
Loss due to negligence of government employes.
Loss due to negligence of contractor's employe not negligently hired.
Loss due to negligence of subcontractor's employes where contractor not negligent and subcontract denies recovery from subcontractor.
Offices: overhead expense of home and branch offices *directly* chargeable to the work.
Operating and maintenance expenses.
Overtime wage.
Patent royalties.
Payroll check charges.
Pension and retirement payments for regular employes.
Plans and designs.
Rearranging plant facilities for contract.
Records and books, cost of keeping.
Rental of contractor-owned equipment.
Rental or purchase of plant or equipment by contractor, collateral expenses incident to.
Rented equipment: maintenance when responsibility on contractor.
Retirement funds: contributions to employes' voluntary retirement fund.
Salary increases where reasonable.
Servicing delivered or installed articles.
Speed-up bonuses made part of the contract.
State taxes.
Subcontract costs.
Superintendent of job: salary of one who is also an officer of contractor.
Taxes: social security and compensation taxes.
Technicians: compensation of professional engineers, draftsmen, consulting engineers, supervisory engineers and other technicians.
Tools and machinery necessary to perform job.
Trade association membership.
Transportation of equipment, loading and handling costs.
Transportation of laborers to site of work.
Transportation of materials and supplies, loading and handling costs.
Transportation of workers.
Travel of prospective employes.
Travel prior to signing contract in connection therewith.
Travel under architect-engineer contracts if authorized.
Travel under construction contracts if authorized in advance or pursuant to standard government travel regulations, i.e., need not be in advance if emergency travel.
Vacation pay.
Wage increase, retroactive.
Wages: extra wages for holiday work, if customary.

financing the work can be greatly reduced.

Recommendation: Don't neglect your accounting system. It's your index to cost and waste, and aids control of profits or losses.

The Cost-Plus-Fixed-Fee Payment Basis: In numerous instances, the government is obliged to obtain production by underwriting the entire cost and a fair profit to the contractor. The cost-plus-fixed-fee agreement is ordinarily used in the following situations:

—Where the production is novel and the contractor has had no past experience upon which to base a price; for example, steel helmets, larger caliber guns and shell, airplane motors, etc.

—Where the production involves difficult and complicated manufacturing effort subject to changing plans and specifications, or wide fluctuations in material costs—for example, steel and wooden ships, airplanes, optical glasswork.

—Where the contractor, though deserving of confidence, lacks sufficient working capital and plant equipment to carry through the job.

—Engineering or building jobs for which the cost-plus contract has traditionally been standard.

The fixed fee on these contracts is limited to 6 to 7 per cent of the estimated cost of the contract, exclusive of the fee.

The cost-plus-a-percentage-of-cost system of contracting has been outlawed. This was the type of cost-plus contract used in the first World war. Under it the contractor was told to go ahead and do the work, the government reimbursing all costs plus a fixed percentage of profit on all he *spent*. The evils in this system are apparent. The more the contractor spent, the more he made.

The cost-plus-a-fixed-fee contract overcomes these evils. Under the new fixed-fee type, the contractor's fee is tied to his *estimated* costs rather than to the amount he *spends*. In other words, his fee is fixed at a specified sum in dollars before performance of the contract. The fixed fee may, of course, be increased or decreased by supplemental agreement where the government orders that changes be made.

Specify Reimbursable Costs: While all legitimate costs not specifically excluded constitute the cost of the work whether or not mentioned in the contract, the safe bet is to have as specific a statement of cost in the contract itself as possible.

Everything not thus definitely stated may be open to dispute. If the government will not explicitly cover an item in the contract, figure that it has to be met from fixed fee.

Keep in mind that the contracting officer is warranted in disallowing frivolous and unnecessary reimbursement. While the contract is inclusive as to costs, needless or extravagant expenditures violate the general intent of the agreement.

Contracts provide that in addition to those items specifically stated in the contract to be allowable costs, you will be reimbursed for other items which in the opinion of the contracting officer should properly be included as costs.

When an item is thus permitted by the contracting officer, it should be specifically certified as being allowed under such a provision. Note, however, that the power of the contracting officer is limited. He may not overstep the bounds of allowable costs. His rulings are subject to reversal by the comptroller general. Although both the comptroller general and the courts usually uphold the contracting officer, if you feel that a decision in your case is in error, don't be afraid to pursue your rights further.

Clear Border Line Cost Items with Contracting Officer: The contracting officer's field representative will either certify a cost for reimbursement, refuse it, or forward it for decision of the contracting officer. After a cost has been certified as reimbursable, payment may nevertheless be refused by the finance officer who makes payments under the contract. Request permission to submit a justification to accompany the field representative's report. It may obviate difficulty with the contracting officer and the finance officer. This justification should be complete and detailed and supported by documents where possible—above all, it should show your good faith in incurring the expense.

Anticipate Novel Expenditures: From time to time certain novel expenditures will be incurred. When these expenditures are foreseen, it is well to attempt to obtain prior

(*Please turn to Page* 113)

TABLE III—Non-Reimbursable Costs

Accountants' wages employed to correct contractor's records, which were disorganized due to inefficiency of contractor's organization.
Accounting system: expenses not clearly provable because of defficient system.
Bad debts and collection costs.
Bidding, general selling and servicing expenses not chargeable to particular contract.
Bond, discount and finance charges.
Breakage of goods in transit.
Buildings: construction or purchase of buildings when rent thereof is authorized.
Capital assets: losses from sales or exchanges of capital assets not necessary to perform contract.
Commissaries: food, etc., and administrative supplies.
Commissaries: paper cups, plates, napkins, etc.
Commissary personnel: wages.
Communications: fees exceeding government rates.
Concessions not approved by the office of the quartermaster general.
Contracts, losses on.
Contributions and donations to organizations others than local charitable or community organizations.
Damage to contractor's equipment rented to government.
Demurrage that was foreseeable.
Discounts that could have been taken.
Entertainment.
Equipment: damage to contractor's equipment rented by government resulting from the negligence of persons other than agents of the government.
Equipment: repairs to rented equipment paid to lessor when not made by contractor.
Equipment: setting up equipment rented from the contractor.
Executive officers of contractor: salary.
Extras: labor or material cost due to additional work the contracting officer could not authorize.
Extras: labor or material cost due to additional work not authorized.
Fine and penalties.
Foreign exchange fluctuation, losses from.
Funeral and hospital expenses for employes.
Guarantee expenses such as correction of defects or deficiencies.
Insurance, life.
Insurance: premiums on insurance not required or authorized by the contracting officer.
Insurance: self-insurance in general.
Interest paid on borrowed capital.
Investment losses.
Labor steward's salary.
Lawsuits, attorney's fees for defense of.
Lawsuits, compromise of threatened.
Lawsuits, successfully defending.
Legal or accounting fees for reorganizations, security issues, capital stock issues, and the prosecution of claims against the United States (including income tax matters).
Losses due to acts of third parties.
Loss due to negligence of employe negligently hired.
Loss due to negligence where remiss in obtaining bond or insurance.
Machinery, jigs, fixtures or tools when only materials are authorized.
Maintenance and depreciation of excess and idle facilities.
Material exceeding statutory price limitation.
Material cost exceeding price schedules if no prior approval.
Membership in organizations other than regular trade organizations.
Membership: local chamber of commerce under operating contract.
Morale: improving workers' morale.
Negligent business practices, added expense from.
Negligent destruction of property.
Offices: general overhead expense of home and branch offices.
Officials of the contractor, salaries of.
Profit sharing payments to officials.
Rented equipment: maintenance in general.
Reserve accounts, increases in.
Strikes or lockouts.
Supervisory representative under War Dept. construction contract.
Taxes: income and excess profits tax.
Travel under construction contracts if not applied for in advance and not for emergency.
Wages of employes on leave (the naval air base contract allows this cost).

16" Toolroom Lathe

PRECISION
FROM START TO FINISH

War production demands precision from start to finish—from toolroom to production shop. Without precision, the vast quantities of war supplies so urgently needed could not be produced in time—for efficient mass production is based on a degree of precision which permits the perfect interchangeability of thousands of duplicate units.

Because of their dependable precision, South Bend Lathes have long been favorites in the toolroom. For this same reason, plus a fatigueless ease of operation, they have been equally popular for manufacturing operations. And now South Bend Turret Lathes are stepping up production in the shops of hundreds of war industries—with no sacrifice in precision.

South Bend Toolroom Lathes and Quick Change Gear Lathes are made in five sizes: 9", 10", 13", 14½" and 16" swing. South Bend Turret Lathes are made in three sizes: 900 Series, 1000 Series, and No. 2-H. Write for a catalog and the name of our distributor located near you.

No. 2-H Turret Lathe

SOUTH BEND LATHE WORKS

LATHE BUILDERS FOR 35 YEARS — Dept. 864, South Bend, Indiana, U.S.A.

Fig. 1—Specially constructed arbor press with accessories for straightening work that involves large numbers of identical parts

STRAIGHTENING HEAT-TREATED PARTS

. . . . is simple and quick job when easily constructed press setup described here is used

By J. B. FROBLOM
Lindberg Engineering Co.
Chicago

HEAT TREATERS often run into straightening jobs that involve large numbers of identical parts such as punches and shafts. A novel straightening press for just this type of job has recently been put into use at the plant of the Lindberg Steel Treating Co., Chicago. It permits the operator to exert pressure on the part to be straightened and immediately observe whether or not it has been straightened without the necessity of removing or revolving the part.

The unit which is shown in Fig. 1 consists of a standard No. 3 arbor press with special attachments to adapt it to production straightening. It is hand powered and in this size will handle work up to ¾-inch in diameter.

The work is mounted on the centers and revolved while the indicator gage below the work shows the amount of runout. The centers are held up by springs which allow the work to move down against the supporting anvils when pressure is applied to the work. These anvils of the type shown in Figs. 2 and 3 are of a special design that allows the height to be varied according to the size of the work or the height of the centers. By adjusting anvils to proper height the movement of the work is minimized when pressure is applied.

One of the centers is spring loaded which allows quick mounting or removal of the work. The center carriers can be spaced to accommodate various lengths of work and clamped to remain in position. The whole assembly of centers and the rod to which they are clamped can be slid from side to side to permit exerting pressure on the work at any point along its length. V-blocks can be used when straightening work which lacks centers.

The procedure for straightening a shaft is as follows:

First, with the indicator located opposite the ram shown in Fig. 4, turn the shaft and observe the amount of runout. Solid line "B" would indicate position of pointer if part were straight. In this case the runout is from dotted line "A" to dotted line "C". Locate the low side against the indicator. The pointer will be at position "A".

Second, press the ram against the shaft enough to move it and observe the position of the indicator.

Third, release the ram and observe on the indicator the amount of change. If the change is one-half the runout, the shaft is straight and the pointer will rest at position "B". If not, try again, exerting more pressure.

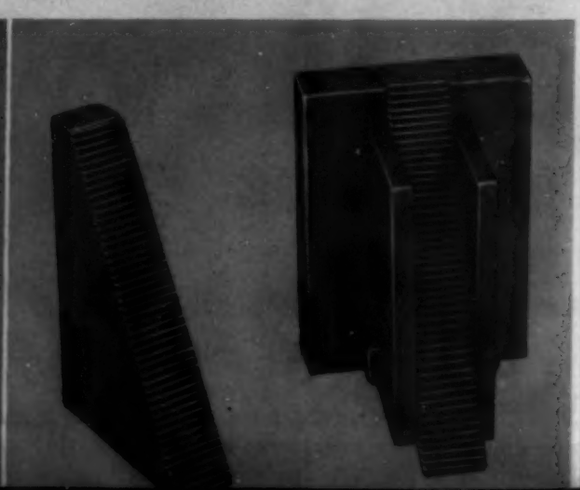
This type of straightening press offers the following advantages:

—The spring-mounted centers make it unnecessary to take the work off the centers while bending it.

—By having the indicator under the ram, the extent of the bending and its effect on the runout can be

Fig. 2—(Left, below)—One type of adjustable anvil. Placed on each side of the indicator at points equally spaced each side of "bend," these confine the straightening operation to the portion of the work that is bent

Fig. 3—(Right)—Another view of adjustable anvil. This design is similar to the one in Fig. 2 but is shown set on end. "Steps" on inclined surfaces lock anvil at any point desired throughout wide range



DOW

STRAIGHT FROM THE MIND of the chemical engineer has come the formula to win wings from the sea. Dow is recovering millions of pounds of magnesium from ocean water so that warplanes can fly faster, farther. Far-seeing designers plan unrestricted use of magnesium to lighten the tasks of man when peace is won.

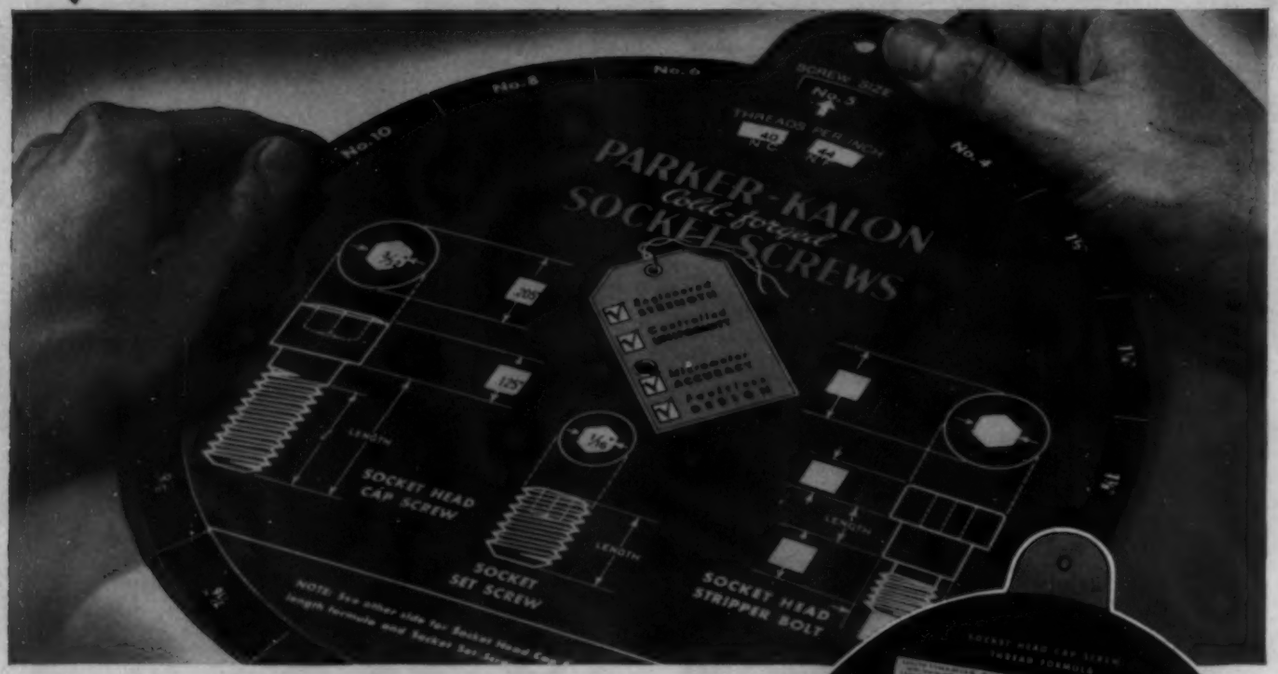
THE DOW CHEMICAL COMPANY, MIDLAND, MICH. TRADE DOWMETAL MARK

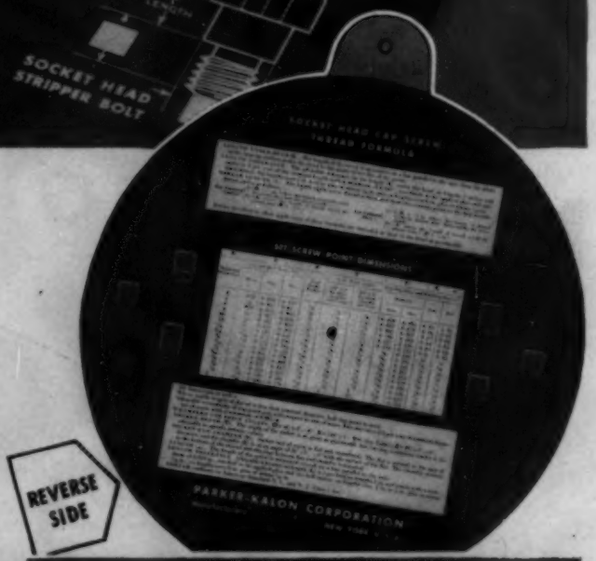
MAGNESIUM

The Lightest Structural Metal . . . One-third Lighter Than Any Other in Common Use

Free! SOCKET SCREW DIMENSION FINDER

that will help you speed up work!





At A Glance -- it gives designers, engineers and production men all important data on Socket Screws!

This unique chart will save you precious minutes and annoyance. A turn of the dial brings before you, in large, easy-to-read figures, all the important dimensions of the standard sizes of Socket Head Cap Screws, Stripper Bolts and Set Screws. On the reverse side you have a table of Set Screw Point Dimensions . . . Cap Screw Thread-length Formula . . . and other useful data. Ten inches in diameter, bright in color, this Finder won't get "lost" on a busy table. Hang it on your wall or drafting board by the metal reinforced hole.

SUPPLY IS LIMITED . . . so this offer of the Finder must be restricted to designers, engineers, drafting and production men in key positions who ask for a copy at an early date. Fill in coupon . . . and please be sure to attach to your company's letterhead.

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Please send the Parker-Kalon Socket Screw Dimension Finder.

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SOCKET SCREWS

Give the Green Light to Defense Assemblies

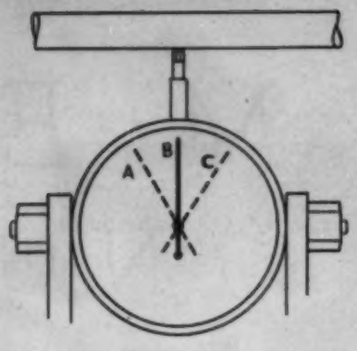


Fig. 4—Dotted lines A and C indicate typical amount of runout found on a warped part when it is revolved in the centers

observed without revolving the work.

—Only a minimum of gage movement takes place due to the adjustable anvils, which can be set at precisely the correct height.

Placing the indicator under the ram might be thought to be objectionable due to the possibility of damaging the gage if the work breaks. Actual practice has shown the chances of damage to be slight even when a piece does break, and if breaking is very prevalent, attempting to straighten must be abandoned, not for the sake of the indicator but for the sake of the work.

The unit can easily be built at a cost of approximately $85.

Lean Iron Ore in Lincolnshire Is Worked in Open Quarries

IN HIS presidential address before the annual meeting of the Iron and Steel Institute, London, May 7, James Henderson, director, United Steel Companies, Ltd., describing the iron and steel industry in North Lincolnshire pointed out that the industry there is based on the deposit of ironstone known as the Frodingham bed which is within easy access of the coal fields of South and West Yorkshire in one direction and has excellent shipping facilities in the other. The ore is worked in open quarries, but in a few years an increasing proportion of the requirements must be obtained from underground. It is a low-grade ore, the average content of iron being under 23 per cent, and probably the leanest ore in the world to be smelted successfully. In recent years successful results have been achieved. The district owes its existence to low-cost pig iron.

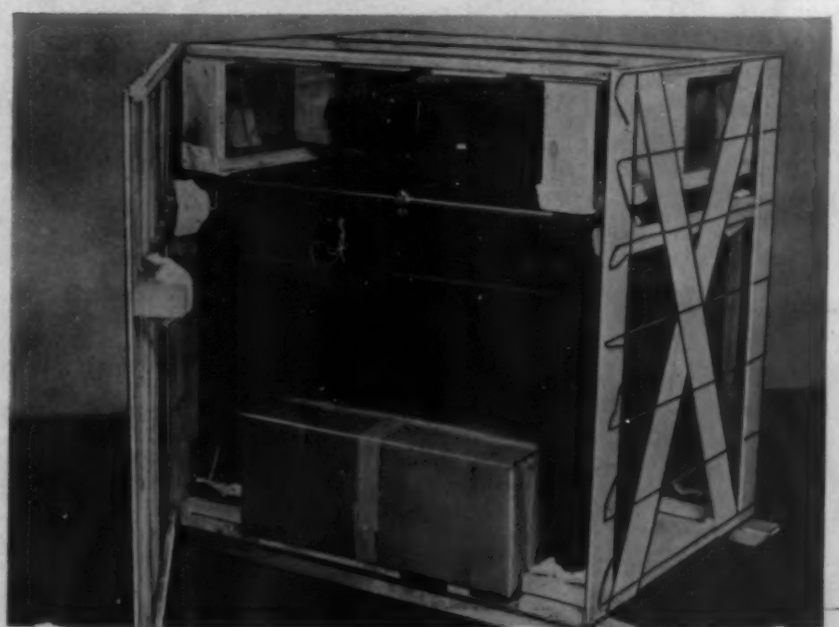
Advances in blast furnace technique and improvements in open-hearth steelmaking could not have been possible without research. Considerable strides have been made in recent years in building up staffs and laboratories for research. Every leading steelmaker has an organization for the study of major problems and the development of new and improved products. President Henderson regards the present set-up of co-operative research in Britain by the existing organizations as transitional. The division of research roughly into technical and fundamental problems is due, in his opinion, to historical accident rather than to any true functional division.

Dr. C. H. Desch, vice president of the institute, said that for many years effort has been made to determine the temperature of metal by the use of immersion thermocouples without success. There always have been difficulties due to the breakdown of the couples themselves and particularly to the failure to find refractories of sufficient resistance to attack. It had been necessary, therefore, to fall back on the optical pyrometer which can be used only when the metal is tapped.

Dr. Desch pointed out that the Schofield-Grace design of pyrometer proved to be extremely useful and that the immersion pyrometer in the form used and recommended by the subcommittee could be used in steelworks practice generally, not only for taking the average temperature of steel but also for exploring the distribution of temperature. Introduction of the carbon sleeve in place of an ordinary refractory sleeve made it possible to use the couple under basic and acid conditions. The instrument is made in a recording form so that a permanent record can be taken of the conditions in successive casts.

Dr. G. B. Waterhouse, Massachusetts Institute of Technology, U.S.A., commented on the fact that, notwithstanding the war, the British Iron and Steel Institute was keeping its work going. He referred to an immersion method, not exactly a thermocouple method, of determining temperature which is being tried with great perseverence in the United States but he did not think the results on the whole had been so successful as those indicated by the authors of the paper. He mentioned an application of the kind of work dealt with where steel is melted in a high-frequency furnace, and in this particular case it is necessary to note accurately the temperature of the molten steel. A platinum thermocouple protected by a silica tube, is the only device available and this has made the steelmaking end of the process a success.

Quickens Shipment of Office Machines



FOR SHIPPING office machines, this new container recently designed by General Box Co., Chicago, cuts tare weight by 48 pounds, saves time in packing and facilitates handling. It merely consists of a one-piece wrap around mat and an especially designed skid bottom and crate top

(Concluded from Last Week)

FLAME DESCALING

Minimizes Surfacing Time and Costs

By E. W. Deck
The Linde Air Products Co.
Newark, N. J.

IN MANY of the steel plants, flame-descaling of blooms and billets is being used instead of pickling to facilitate inspection of steel for defects prior to scarfing. At one plant, when this procedure first was adopted, a weak acid etch was used, after descaling, to exaggerate the appearance of the defects, but it was soon found that descaling alone was satisfactory. It has been estimated that flame-descaling has resulted in a saving of about 20 per cent in the cost of this steel-inspection operation.

Descaling speeds at this plant vary from 10 to 20 feet per minute depending upon the condition of the scale. Hourly rates have averaged about 25 to 30 tons per descaling operator on typical sections, but the rates have at times reached 40 to 45 tons per man per hour. Most of the material descaled at this plant is straight carbon steel, although some alloy steel containing 0.50 per cent carbon, 1.50 per cent manganese, 0.30 per cent silicon, 0.50 per cent copper and 0.50 per cent nickel has been processed. Descaling speeds on this material are slightly slower but it can be cleaned 100 per cent.

Ideal for Castings

Results so far obtained with flame-descaling of castings indicate that in the majority of instances this method is faster, easier and cheaper than sandblasting. In addition, flame-descaling often can be applied to a number of sandblasted parts for the removal of additional scale, especially from certain inside surfaces that are difficult to reach with a sandblast. Inspectors of a certain large foundry have expressed a preference for flame-descaling of castings because they claim the process uncovers surface blemishes much more effectively than do other methods. This same company made a special study to determine whether the heat of the flame might affect the properties of annealed castings, and it was found that even on the lightest materials there was no trace of harm.

Another foundry has found that since flame-descaling was substituted for hammer-bobbing of annealed castings, cleaning time has been decreased 80 per cent on large pieces. It was thought originally that cast-in sand would give trouble on many castings, but the sand appears to be popped loose with the underlying scale.

As a rule, speeds for descaling forgings are slower than for castings as the scale has been pressed in, and is tough and dense from working. However, by oxyacetylene flame-descaling practically all scale comes off, leaving the surface clean for machining.

Flame-descaling is being used successfully in the removal of heavy scale from chromium-nickel steel forged into light and heavy plates and heat-treated. The scale encountered in this work, comparable to that found on any second or third forgings, varies from small particles up to ¼-inch in size and up to ⅛-inch thick, and can be 95 to 98 per cent removed. Lineal speeds vary up to 17 feet per minute, depending on the condition of the plate and thickness of scale, but average from 4 to 6 feet per minute.

Flame-descaling is being used enthusiastically at a steel mill in the Middle West in the production of forged blooms or so-called die blocks. These blooms are cooled slowly from a high temperature after forging, resulting in formation of a thick layer of scale which is extremely tough and dense. Some scale is slightly pressed in from the working. The scale must be removed so as to facilitate inspection for conditioning prior to shipping the die blocks to another plant where they are fabricated. Cost records compiled by this steel mill indicate that flame-descaling is resulting in a considerable saving in time and overall cost for conditioning per bloom, as compared with the previously used method of removing scale by hammer-bobbing with blunt-end chisels. In addition, it was found that removal of the scale by the oxy-acetylene flame is more thorough.

Two installations providing for automatic descaling are of particu-

Flame descaling of this large turbine casting was completed in four man-hours in contrast to 25 man-hours required to descale a duplicate casting by a bobbing hammer

PRACTICAL SERVICE

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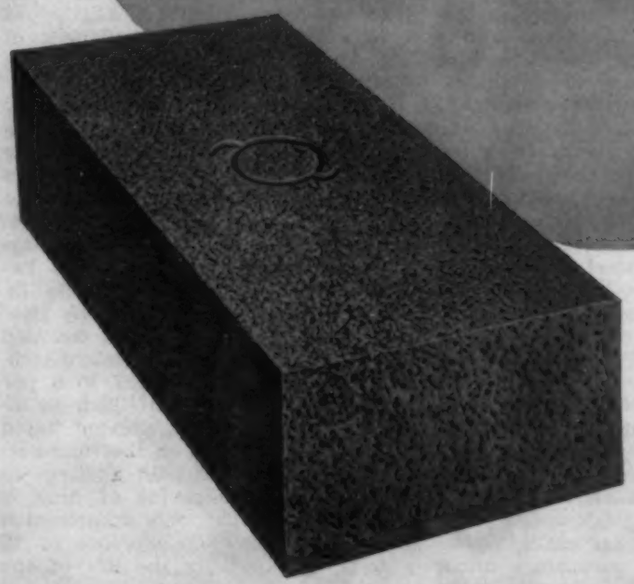

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BABCOCK & WILCOX

Upper left—Oxyacetylene flame descaling being used for removal of hard, brittle scale from this annealed casting. Some of the removed pieces are as large as 1 inch and from 1/16 to ⅛-inch thick

Upper right—Removal of scale from these slabs by the oxyacetylene flame facilitates inspection prior to flame-scarfing and makes it necessary to hand-scarf in spots only, thus effecting a savings in conditioning costs

Left—Scale is completely removed from blooms at an average rate of 10 to 20 feet per minute, depending upon the condition of the scale

lar interest. One is used for cleaning round alloy steel bars of all sizes. Usually these bars must be straightened, an operation which requires the removal of all scale because of the "rolling-in" effect and because of wear on the straightening machine. Even when not straightened, these rounds must be descaled before shipment.

The equipment consists of a floating frame supporting a circle of 7-flame descaling heads. The frame is floating and guided by skids to allow for camber. Also, the heads can be adjusted in and out and also around the periphery of the work in order to accommodate any size of round. The work is fed to the equipment on a variable-speed roll table, and scale is removed from alloy bars at 12 feet a minute and from straight carbon rounds at 20 feet a minute.

Another installation consists of a 30-flame descaling head which removes scale rapidly from forged and anealed rings of S.A.E. 3325 steel. The rings are mounted on trunnions which revolve them during descaling. Prior to this installation, no satisfactory method had been found for descaling these rings.

Various grades of steel, such as the 4 to 6 per cent chromium steels, cannot be pickled satisfactorily because the scale on these steels is found to be practically impervious to the usual pickling acids.

Advantages of Descaling

In general, scale removal by the oxyacetylene flame requires little time.

Flame-descaling equipment is portable and can be taken to the work. Billets and blooms can be flame-descaled close to or in the same location where they are to be conditioned, thus eliminating the time and cost of transporting the steel to and from the cleaning shed. Furthermore, since flame-descaling can be accomplished successfully on steel of a temperature up to 700 degrees Fahr., the steel can be taken off the roll table, descaled by the oxyacetylene process, and then conditioned while the metal is still relatively hot. The fact that the slabs are still warm after being cleaned for inspection makes it practical to flame-condition air-hardening steels.

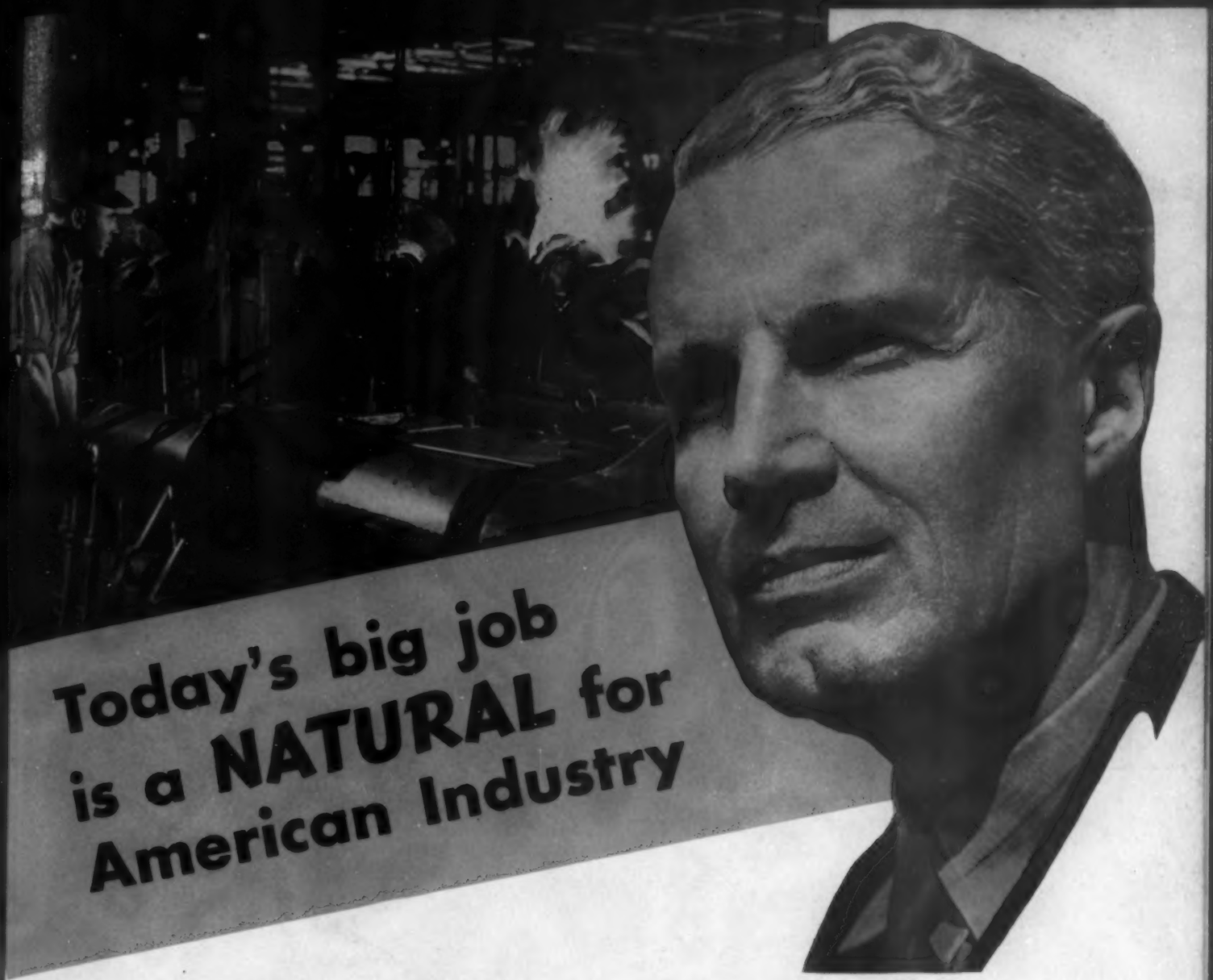
In a few descaling operations, however, it has been found that a combination flame-descaling and pickling process has many advantages in that it overcomes minor shortcomings of both processes. Defects in pickled steel are readily visible because they show up as black oxide streaks against a rusty, pickled background. These are more readily visible than the silvery, fused oxide streaks marking defects in flame-descaled material. Consequently, some descaled materials are given a quick etch in a weak pickling wash. This etch type of pickling does not have any deleterious effect upon the steel nor does it require expense in acid preparation, replacement or vat upkeep.

Many alloys which resist the descaling action of both the flame and pickle can be quickly and effectively descaled by a combination process wherein the flames loosen the scale sufficiently to allow the acid to penetrate. At one plant a combination process has been adopted which has reduced pickling time for some steels from 10 hours to less than 1 hour and has helped to relieve a serious bottleneck of production work at the pickling sheds.

The materials being treated by the combination method in this instance are all types of alloy blooms ranging in size from 4 x 4-inches to 10 x 10 inches. Some of the steel blooms which have been annealed are found to have three layers of tightly bonded scale. Removal of this type of scale by pickling alone is an extremely slow process. The steel is first descaled and then placed in a standard pickling solution of about 7 to 8 per cent sulphuric acid to which an inhibitor is added to prevent rapid attack by the acid on the completely descaled areas. In addition to the remarkable saving of time, it was found that this combination method caused an increase of 10 to 15 per cent in the life of the acid.

Recent developments have indicated the success of oxyacetylene flame-descaling to supplement sandblasting for removing weld scale and excess flux from electric arc welds. The adoption of flame-descaling for this purpose was of particular advantage to a manufac-

(*Please turn to Page* 115)



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ANACONDA *Anaconda Copper & Copper Alloys*

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3

PUBLICATIONS— FROM OUR TECHNICAL DEPARTMENT TO YOURS

Available also to you, without cost, is a list of up-to-the-minute publications on copper and copper alloys. They are literally packed with useful, technical information which your engineers will find extremely helpful: Applications, compositions, general physical constants, physical properties; fabricating procedures; oxy-acetylene and electric welding of copper and copper-alloys; weight tables and conversion factors; flow tables for pipe and tube; operating characteristics of copper bus conductors; etc., etc. Some of these Anaconda Publications are listed here. They may give you the information you need.

ANACONDA PUBLICATIONS

B-31	Anaconda Metals in the Aircraft Industry
B-1	Pipe, Copper Tubes and Fittings
B-28	Anaconda Copper and Copper Alloys
B-2	Tubes and Plates for Condensers and Heat Exchangers
B-9	Hot Pressed Parts and Pressure Die Castings
B-21	Anaconda Beryllium Copper
B-13	Copper and Copper-Alloy Welding Rods
B-14	Free Cutting Brass Rods
B-22	Anaconda Electrical Conduit
B-16	Tobin Bronze
C-24	Copper Tubes for Industrial Applications
C-25	Anaconda Copper Bus Conductors
E-1	Everdur Metal Casting Ingots
E-5	Everdur Metal Applications, Physical Properties and Constants
E-6	Everdur Metal Bolts, Screws and Accessories
E-9	Copper and Everdur Fabricated Fittings
E-13	Everdur Metal Tanks and Equipment

Requests for Anaconda Publications should be sent to:

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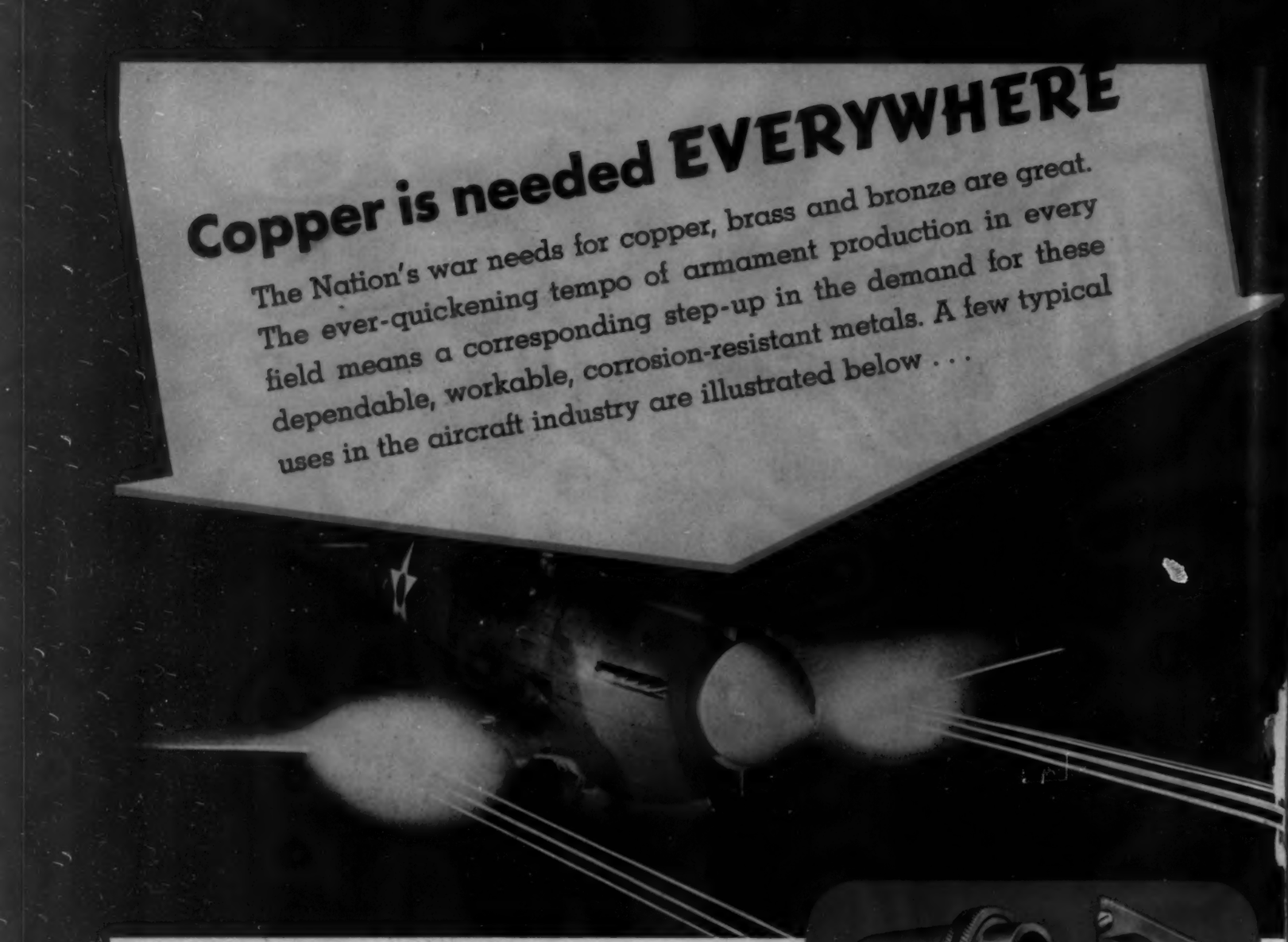

For Instance:

The building of Curtis Pursuit Ships and Army Cargo Transports consumes large quantities of Anaconda Metals; brass rod and strip, copper tubes, beryllium copper—also *Everdur tubes for hydraulic lines. The Curtis Kittyhawk illustrated (one of the P-40 Series) is firing copper-alloy jacketed cartridges from all six wing guns.

Only a contact pin—yet, the Cannon Electrical Development Company, manufacturers of multi-contact electrical cable connectors, uses hundreds of thousands of pounds of Anaconda Brass Rod to keep pace with the electrical plug requirements of our rapidly expanding aircraft industry.

Tons of specially-treated *Tobin Bronze are used by the Aero Supply & Mfg. Co., Inc., in producing the barrels of aeronautical turnbuckles because this American Brass Company Alloy machines and threads readily, and has the required physical properties to meet U. S. Army Specifications.

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PLYMOUTH Flexomotive

DOLLAR FOR DOLLAR——————THE GREATEST LOCOMOTIVE EVER BUILT

Fig. 1. (Left)—Steel strip is being moved on long skid platform by a lift-truck. Note angle iron reinforced lengthwise edge of platform and three supporting U-shaped steel legs. Fig. 2. (Right)—Reinforced wooden frames interlocked by angle irons bolted to the corners transform the skid platform into a skid box suitable for carrying parts. Note flanged angle irons which overlap frame below or platform itself

LIFT-TRUCK-SKID

Materials Handling System

. . . . saves up to 60 per cent of man-hours required for handling material in process

THE LIFT-TRUCK-SKID system of materials handling developed by Barrett-Cravens Co., 3260 West Thirtieth street, Chicago, has effected savings that amount to as much as 60 per cent of the man-hours formerly required to transport goods within a manufacturing plant.

The skid platform is wood with angle irons along the two long sides. Steel legs bent to a U-shape are attached parallel to the long side at each corner of the platform. An extra pair is added in the middle of the long sides of long, narrow skids used to move sheets and strips. Fig. 1 shows a long skid being used to transport strip steel. Note the leg in the middle of the long side as well as the ones at either end.

To convert the skid platform into a box skid for carrying small and large parts, it is only necessary to fit over the platform a 4-sided wood frame reinforced with steel angle sections bolted to each corner. These angles are flanged outward slightly at the bottom of the frame and extend downward an inch or so below the level of the frame to permit them to fit over the corners of the platform or over the corners of the frame below.

Thus the sides can be built up to any height desired as shown in Fig 2. Here three frames are superimposed to form a deep box to transport cast metal parts. Note the flanged angle sections which make the frames rigid and interlock them to one another and to the base skid platform.

In operation, the lift truck is rolled under the skid platform, and with one stroke of the handle in the case of lighter trucks it is lifted so it raises the skid and load. Heavier trucks require several strokes of the handle to raise them. The truck has an automatic lifting latch so it engages automatically and no treadle stepping is required. Skid is prevented from sliding down into lift-truck handle by a steel plate in front of the handle. Load is then rolled to the point where it is desired and gently lowered by stepping on a release treadle.

Because of its flexibility, the lift-truck skid system is employed widely in the metal producing and metalworking industries. At a well-known company manufacturing steel locker equipment and shelving, sheets of steel are sent to be sheared or cut and then on to the punch press. After being punched, the product is sprayed, and in some instances enameled, before going to the shipping department. The lift-truck skid system is employed in each of these changes of location, and a saving of 25 to 60 per cent in man-hours with a resultant significant cash saving is reported over the former handling method.

Companies manufacturing castings and forgings report savings of more than 25 per cent in man-hours cost of transporting parts throughout a plant. Steel jobbers and manufacturers of steel and metal parts also are important users of this type of materials handling system. Tin-plate lithographers find it an efficient method of moving work from one operation to another. Tin-plate jobbers, too, are heavy users of lift trucks and platforms. They use the lighter type of truck having a capacity ranging from 2000 to 3500 pounds.

(Above) Unloading 2-ton packs of steel sheets with a Cleveland Tramrail Model A Chain Hoist and hand-operated sheet lifter. The loading dock rail extension is a part of an extensive plant-wide Cleveland Tramrail system.

(Top picture) One man easily loads long, heavy boxes onto the truck with this hand-propelled crane and electric hoist.

(Right) Materials are taken directly from truck to fabricating department or vice versa with this Cleveland Tramrail system. For handling small numbers of sheets the inexpensive sling-type sheet grab is satisfactory.

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TAM Foundry Zirconite Sand is available in three grades, Zirconite Sand A has an approximate melting point of 3812° F. Zirconite Sands B and C 3650° F.

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ALLOY MANUFACTURING COMPANY

TAM Foundry Zirconite Sand "A" was used in the core for the chrome steel impeller wheel illustrated. Note the clean, smooth surfaces.

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Makers of Printing Plates

LIST FACILITIES FOR WAR PRODUCTION

ALREADY a number of printing plate manufacturers are known to be doing war work, according to J. Homer Winkler, Ace Electrotype Co., Cleveland, who reveals that one Akron engraving plant is working three shifts seven days a week manufacturing sheet steel templets for the Goodyear Aircraft Corp. The sheet metal is covered with a photo sensitive material and outlines of the part wanted projected by photographic means directly upon the sheets themselves. When developed out, this results in outlines to exact scale on the sheets, which subsequently are followed in cutting out the templets.

In London a number of photoengravers are extremely busy on war production but claim they cannot divulge the nature of their work. Electrotypers report several instances of building up undersized parts by heavily plating them with copper, nickel or chromium thus reclaiming parts which might otherwise have to be thrown out and thereby saving all the time invested in their production. Also, a few electroformed parts of copper have been made for subsequent use as patterns.

Extensive use is reported being made of molded rubber printing plates in Canada. The principal application appears to be in marking of shell, fuzes, canisters, haversacks, canvas bags, belts, and the like. Apparently this is not yet being done in this country.

Printing plate manufacturers have plants located in almost every medium sized city of this country. No large city is without a number of them. It is estimated that all of these plants are now operating at 60 per cent capacity or less, due to falling off of advertising and printing volume. Already some 10 per cent of the present volume of these plants is on high-priority work (A-5 or better). As the facilities available become better known, no doubt they will be better utilized in war work. To further this end, some data on the facilities available are given:

Printing plate industries concerned include 700 photoengraving plants with 25,000 employes; 300 electrotyping plants with 9000 employes; 200 stereotyping plants with 1000 employes; 50 molded rubber printing plate plants with 250 employes; 50 wax engraving plants with 200 employes. This makes a total of some 1300 plants with 35,450 employes.

Some further details on the facilities and type of work that can be done by these various plants are listed. From these you may be able to check roughly whether or not your capacity for war production work might be extended by subcontracting some of your work to these plants.

Photoengraving: Equipment used includes cameras, photographic development and printing equipment, etching tanks, routers, circular saws, transfer and proof presses, skilled hand tooling and engraving.

Operations regularly handled in photoengraving plants include photographing from flat copy or three-dimensional objects; assembling two or more negatives; photographically enlarging or reducing; photosensitizing of various surfaces including all metals; photoprinting on metallic, wood, plastic, plaster and similar surfaces; selective or overall etching; either obverse or reverse etching of metal surfaces after photoprinting; transferring inked images to plain surfaces; routing of copper, zinc, brass, bronze and lead alloys.

Electrotyping plants include platen pressure presses, graphiting equipment, plating tanks, electric motor generators for plating, open-top heated metal pots for lead and lead alloys, oil immersion heat-treating units, circular saws, plane shavers, roughers, routers and skilled hand engraving and finishing facilities.

Operations handled in this type of plant include preparation of molds in wax or sheet lead by pouring, forming or pressure; application of electrically conductive films to nonconducive surfaces such as wax, plastics and the like; electroplating of copper (acid), iron and nickel; selective or spot plating; electroforming with either copper or nickel; building up of undersize parts with copper or nickel; heat treating lead alloys by the oil immersion method; open casting of lead alloys; shaving of lead alloy sheets or blocks; routing of copper, zinc, brass, bronze and lead alloys; making simple assemblies.

Stereotyping equipment includes platen and roller pressure presses, heated platen presses, thin lead alloy casting boxes, shaving and roughing machines, routers, circular saws and matrix molding accessories.

Operations handled include the making of matrix molds in paper material, casting of thin objects in lead alloys and pressure forming.

Molders: Equipment found in plants making molded rubber printing plates includes heated platen pressure presses, circular saws and routers. The operations involved include the preparation of molds for plastic materials; pressure molding of thin objects where heated platens are required; molding of rubber or elastoplastics and certain other plastics into plates for marking or for exact shapes, sizes and thicknesses for various objects; attachment of rubber pieces or plates by various means; devices or pieces for service; vulcanizing rubber to flat metal sheets up to 22 x 28 inches.

Any manufacturer who believes he could use some of these facilities listed should get in touch with his local photoengraver, electrotyper, stereotyper, manufacturer of molded rubber printing plates or wax engraver by looking in the classified section of his local telephone directory or should write J. Homer Winkler, Ace Electrotype Co., 1501 Superior avenue, Cleveland.

Compound Removes Heat Stains from Aluminum

Heat stains or discolorations appearing on aluminum sheets and parts as a result of heat treating and quenching can be completely removed and original finish of parts restored, it is reported, by immersing work from 2 to 15 minutes in solution of a material recently developed by Oakite Products Inc., 57 Thames street, New York. The material—Oakite compound No. 84-A—is diluted in water (8 ounces per gallon of water) heated to 180 degrees Fahr.

According to the manufacturer, the material and method employed for removing heat stains or discolorations also are equally suitable with variations for use in connection with such other operations as degreasing aluminum parts before anodizing; preparing aluminum alloy structures, assemblies and parts for resistance spot welding; removing anodizing film from rejected aluminum parts; and stripping anodizing coatings from racks, straps, hooks, etc.

Concentration and temperature of solution and time of immersion are determined by the particular types of work to be done and condition of the parts to be cleaned or stripped.

like having

4 EIGHT HOUR

This machine tool company starts with a 3 inch round steel rod which requires drilling, reaming and slotting. After the metal working operation is completed, there is a ¼ inch outside shell – the inside has been completely removed. Since they changed to Tide Water Cutting Oil the time to complete each unit has been reduced from 23.6 to 16.75 minutes. Tycol oils have stepped up production as much as another 8-hour shift. It further lowered machining time, increased tool life by some 70%.

Like hundreds of other companies, this concern knows the facts of increased production with modern Tycol Cutting Oils. Tycol sulphurized cutting oils will not gum or form deposits . . . will not turn rancid nor tarnish machined parts.

War production speed-up, through the proper application of the correct cutting oil and industrial lubricant, is the aim of Tide Water. Engineering assistance is available to help you achieve this end. For full details, write to the Tide Water Associated Oil Company, 17 Battery Place, New York, N. Y.

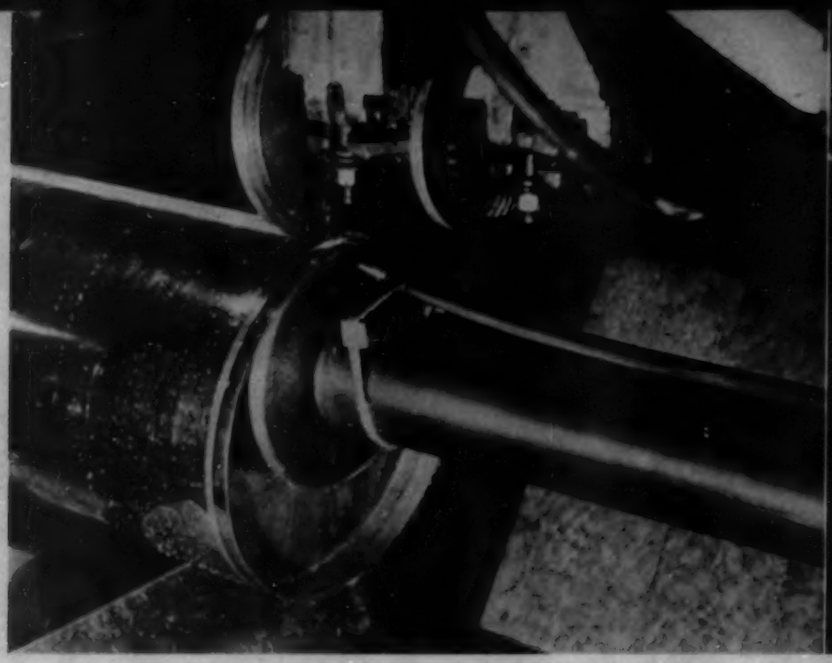
DRUMS! DRUMS! DRUMS! DRUMS!
War needs make it extremely important that all empty drums be returned immediately.

INDUSTRIAL TYCOL OILS-GREASES

TIDE WATER ASSOCIATED OIL COMPANY EASTERN DIVISION 17 Battery Place, New York
Regional Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL

SHIFTS PER DAY!
OIL IS AMMUNITION
USE IT WISELY !



HARD SOLDERING COLD-WORKED COPPER

Copper alloys and other nonferrous metals are now joined easily at low temperatures without grain growth, loss of hardness or need for reworking

Fig. 1. (Left, above)—Tempobrazing the head of a copper hot water tank. The work is performed at high production speeds, and the necessity for reworking the joints is eliminated

Fig. 2. (Right)—Joints in the head, bottom and sides have been completed on these cold-worked copper tanks. Breathing and rupture tests show that these tanks have exceptionally good physical properties

A DISADVANTAGE of brazing nonferrous materials is the loss of hardness or temper in and around the joint. This loss is particularly marked in the case of brazed joints made in cold-worked copper and copper alloys. The brazing operation leaves the metal fully annealed, or "dead soft" as it is called, and materially affects its physical properties. For example, when copper is cold worked to full hardness it has a fine, uniform grain structure and develops a tensile strength of over 60,000 pounds per square inch. When dead soft, however, the tensile strength drops to less than 40 per cent of the full hard value, and the grain structure becomes coarse and irregular.

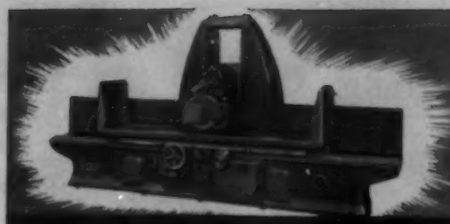
The pronounced change in the grain structure of copper when hard rolled and when fully annealed is shown in the photomicrographs, Figs. 3 and 4. This physical change occurs when the metals are heated above a certain temperature and particularly when they are heated and then not allowed to cool immediately. The effect is likely to be the same whether the metals are heated to a high temperature for a fairly short interval or to a lower temperature for a longer interval.

The temperature required to flow hard solder or brazing materials now commonly used usually exceeds the range which, if maintained for an appreciable interval, effects a change in the grain structure of

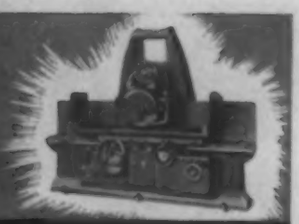
Fig. 3. (Left, below)—A section of 1/16-inch hard-rolled copper enlarged 200 times to show the uniform grain structure

Fig. 4. (Center, below)—A section of 1/16-inch annealed copper enlarged 100 times showing the coarse and irregular grain structure

Fig. 5. (Right, below)—A transverse cross section of a Tempobrazed lap joint in 1/16-inch copper, enlarged 100 times to show the uniform film of brazing alloy and the fine-grained appearance of the adjoining metal



MATTISON
HIGH-POWERED PRECISION SURFACE GRINDER



Cuts time up to 75%
ON JOBS PREVIOUSLY HAND SCRAPED

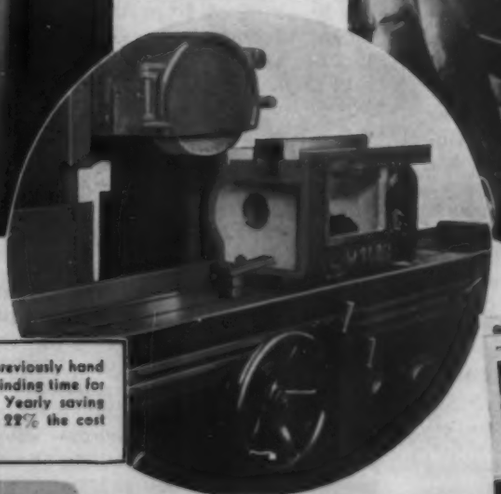
Examples: Time on pump case reduced from 40 hours to 4 hours . . . . . Time cut from 12 hours to 3½ hours on slide castings . . . . . Yearly saving on Housings — 22% the cost of machine, etc.

When added together, time savings like this not only make a big difference in manufacturing cost, but help speed up delivery schedules. To see what Mattison High-Powered, Precision Surface Grinders can do on your work, send us blue prints for production estimates.

● High Pressure pump case previously finished, planed and hand scraped in from 40 to 48 hours — Now the Mattison Grinder has made these operations unnecessary, reduced time to 4 hours and case comes through with a fine finish and accurate to within .0003".

● Cast iron slide previously rough planed, finish, planed and hand scraped — NOW GROUND on Mattison Grinder (6 pieces per set-up) at an 80% savings in time. Finish planing and scraping operations eliminated.

● Cast iron frame previously hand scraped, NOW GROUND top and bottom of casting, shoulder and inside surfaces. 75% time saving.

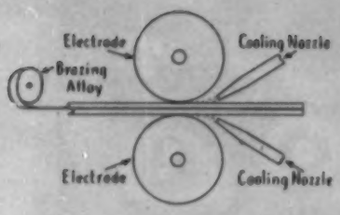


● Cast iron Housing previously hand scraped in 8 hours. Grinding time for housing is 2.5 hours. Yearly saving on this job alone was 22% the cost of machine.

SET-UP SHEETS

Containing complete information regarding these and similar jobs will be sent upon request.

MATTISON MACHINE WORKS
ROCKFORD · ILLINOIS



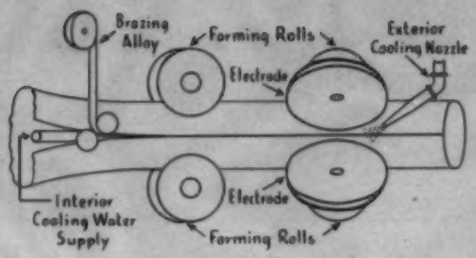


Fig. 6. (Left, above)—Simplified diagram of Tempobrazing operation. The brazing alloy in ribbon form is inserted before the work passes under the electrode wheels of the welder. A continuous flow of cooling water directed at the joint chills the work immediately after heat application and prevents changes in the grain structure of the metal

Fig. 7. (Right)—A method of producing continuous lengths of cold-worked copper tubing by the process is here diagrammed. The work is shaped for forming rolls and brazed in one operation. Reworking of the brazed joint is unnecessary

the metal in the pieces being joined. Under present methods of brazing, there is no practical way to control the temperature and the time interval with sufficient accuracy to avoid the possibility of altering the grain structure.

By employing accurately metered electrical energy and special silver solder having a flow temperature low enough to make excessive heating unnecessary, the Tempobrazing process developed by Thomson-Gibb Electric Welding Co., Lynn, Mass., makes possible the accurate dual control of both the amount and the time of heat application to the point where grain growth is prevented and loss of hardness or temper in and around the joint is avoided. The operation is performed in a resistance seam welder with suitable means for inserting the silver brazing alloy between the pieces being brazed and for chilling the work as rapidly as the joint is made. The brazing alloy, developed by Handy & Harmon, Bridgeport, Conn., is in the form of a thin ribbon as wide as the intended joint. When cooled and hardened it forms a thin homogeneous film free from irregularities, voids or orifices. Fig. 6 shows a simplified diagram of the process.

A section of a Tempobrazed joint made in hard-rolled copper is seen in Fig. 5. Note the uniformity of the solder film and the fine-grained appearance of the metal as compared with the structure of the annealed copper shown in Fig. 4, page 100. While not shown in the picture, the areas surrounding and immediately adjacent to the joint are unchanged in their physical structure and are all like the section shown in Fig. 3.

Fig. 1 illustrates how the process is applied to the manufacture of nonferrous hot-water tanks, and Fig. 2 shows the completed tanks. Ordinarily, these tanks are produced by resistance welding, in which case special alloys such as monel or several of the silicon brasses must be used, or by brazing and then reworking in order to obtain the required strength. While the resistance welding method offers the advantage of high production, the special alloys required are expensive and may be difficult or nearly impossible to obtain.

Production by the Tempobrazing process is comparable to that obtained by resistance welding, and there is no necessity for reworking. Copper tanks made in this manner show great ability to withstand "breathing tests" and have high rupture values.

The process can be applied to the fabrication of articles made from nonferrous sheet metal such as tanks, cans, boxes, boilers, continuous lengths of tubing (see Fig. 7), refrigerator parts and similar units where it is advantageous to use cold-worked materials without the necessity for reworking after the brazing operation. It cannot be applied under conditions where rapid heating and chilling are impossible or not practical, and it offers no advantage beyond high production if the metal is already in an annealed state or must be reworked for some reason *not* associated with the brazing operation.

Practice on Metal Lathe Now In Print

Printed copies of simplified practice recommendation R3-41, "metal Lath," expanded and sheet, are now available according to the Division of Simplified Practice, National Bureau of Standards, Washington. It now lists weights of stock types of flat, flat-rib, ⅜-inch rib and ¾-inch rib expanded metal lath and of sheet lath—also stock sizes of cold-rolled channels and small nose corner beads. The channels and corner beads are included for the first time.

Current revision achieves a further reduction of three weights in the flat-expanded and flat-rib expanded metal lath categories. It also eliminates from manufacturers' stock lists three sizes of cold-rolled channels and four sizes of small-nose corner beads. These changes are expected to effect a substantial conservation of steel, in that inventories required to be carried at the mill and in warehouses of dealers and jobbers will be reduced by an estimated 30 per cent.

Copies of the recommendation may be obtained from the superintendent of documents, Government Printing Office, Washington, for 5 cents each.

Machine Tools at Work

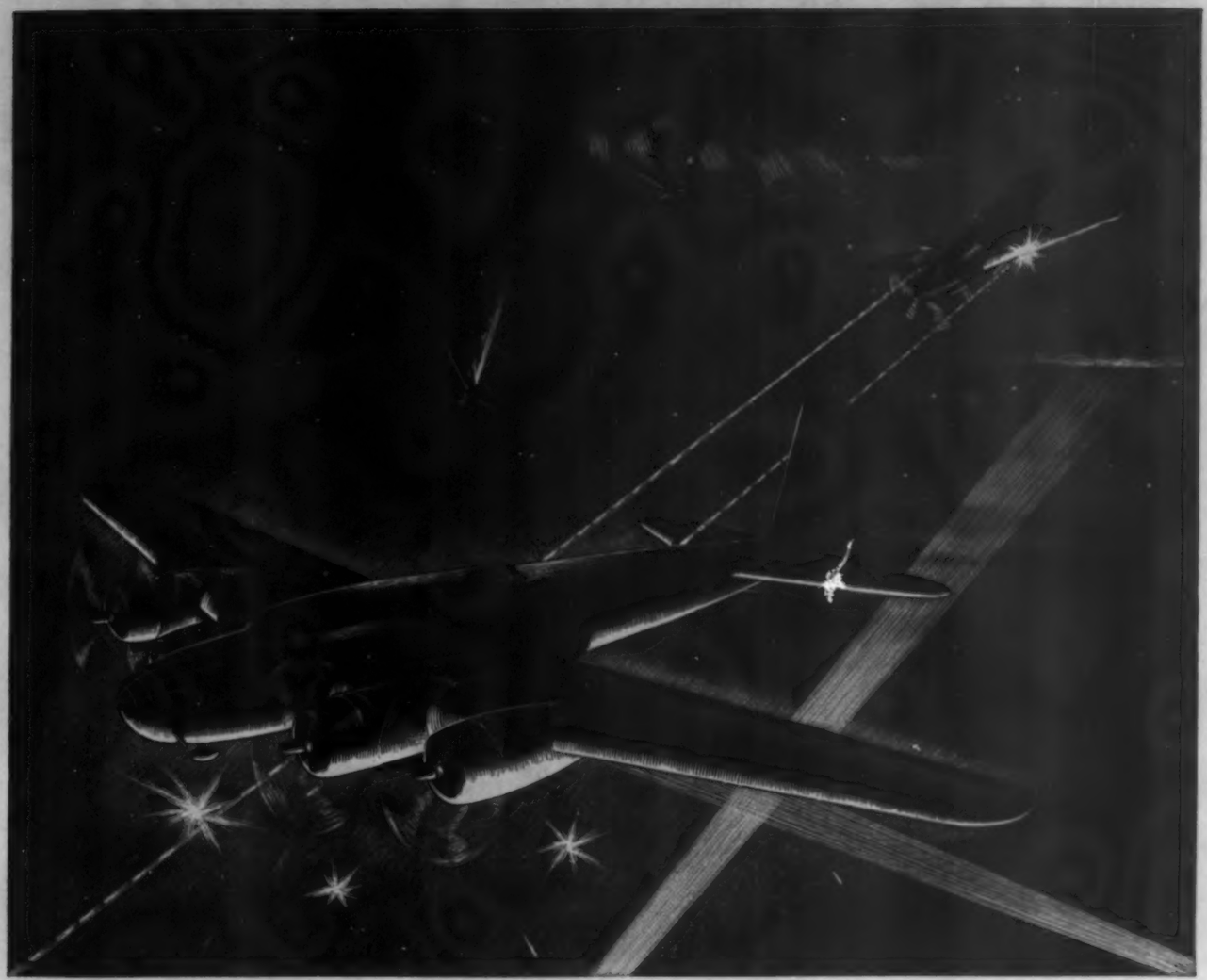
Machine Tools at Work, by Charles O. Herb; cloth, 552 pages, 6 x 9 inches; published by The Industrial Press, 148 Lafayette street, New York, for $4.

Purpose of this book is to present condensed illustrated descriptions of the more unusual operations on many different types of modern machine tools. It is intended chiefly for those who have at least a fair knowledge of machine shop practice. These operations have been selected as they represent approved practice and illustrate many unusual applications of the latest designs and types of machine tools.

The 430 illustrated descriptions are intended more especially for advanced or graduate apprentices and machinists, and also for shop executives interested in the equipment and procedure employed in many different types of machine-building plants. The illustrations were obtained from many of the most progressive plants in the United States. Such exacting operations as are found in manufacture of airplane engines, ordnance and similar work are included.

Issues Bibliography on Machining of Metals

Sheffield City Libraries, Sheffield, Eng., has issued a bibliography on machining of metals, covering the period 1935 to date, with some important older books and articles also included. In view of the paper shortage and the limited edition, issued copies cannot be supplied to individual students, but only to firms and research organizations making application officially, enclosing threepence (about 6 cents) for postage.



When fighting engines strain against studs of steel

SMALL but vitally important are the steel studs used in assembling the engines of fighting planes. Made of one of the toughest alloy steels, they are unusually difficult to machine rapidly and accurately.

Rejections were running far too high in one well-known plant making these parts. The problem was put up to Shell. Using existing equipment without change, and the recommended Shell Cutting Oil, production speed shot up 50% . . . rejections practically vanished. And cutting tools delivered more than twice as many studs before regrinding was necessary.

Shell men were able to offer this kind of service because Shell Industrial Lubricants are up-to-the-minute in every respect. Yet Shell, realizing that tomorrow's production schedules will present even more difficult problems, is constantly improving Shell Lubricants to meet future needs.

• • •

Have you checked the effectiveness of your lubricants lately? When you use Shell products you can be sure you are getting an advanced, efficient and practical lubrication service . . . a definite help in the greatest production program in history.

SHELL

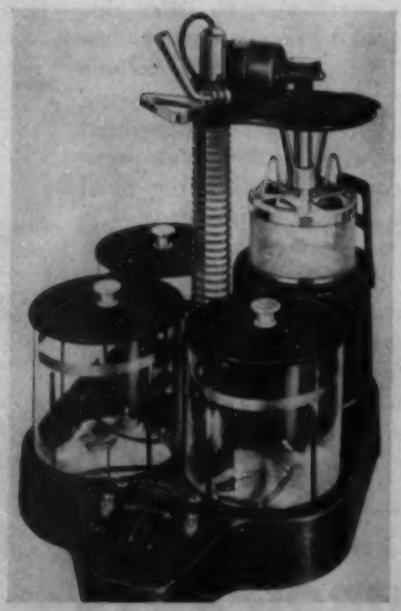
☆ ☆ ☆ WAR PRODUCTION SPEEDS AHEAD ON ☆ ☆ ☆

SHELL INDUSTRIAL LUBRICANTS

Industrial Equipment

Cleaning Machine

L & R Mfg. Co., 54 Clinton street, Newark, N. J., has placed on the market a new, larger model of its precision cleaning machine used to clean delicate instruments such as miters, gages and watches. Its feature is it may be controlled and varied for any particular problem. Disassembled parts of instruments are placed in the unit's work basket and the basket is snapped into position on the motor shaft. A center bar on which the rheostat-controlled motor is mounted positions the basket over each solution jar and the drying chamber. In operation, the basket is first lowered into the cleaning solution jar which contains a nonfoaming cleaner. Then the basket is driven through a 14:1 ratio. Monel baffles within the jars assure thorough agitation. After running in the solution the motor is cut and the basket is raised in the jar above the liquid level and again rotated to throw off excess solution. These operations are then repeated in the second and third jars both of which contain the rinsing solution. The motor carrier is then revolved to the fourth position which places the work basket over the drying chamber. This contains a separate motor and fan in conjunction with a vitreous heater unit. About 2 or 3 minutes are required for each phase of the cycle depending on the type of instrument cleaned and the condition of the parts. Work basket of the unit has an inside diameter of 5½ inches and is 3¾ inches deep. The jars have a 1½-gallon capacity and have an inside diameter of 7 inches and depth of 9 inches. The machine occupies a space of 17¼ x 16½ inches and is 23 inches high overall.



Drum or Barrel Carrier

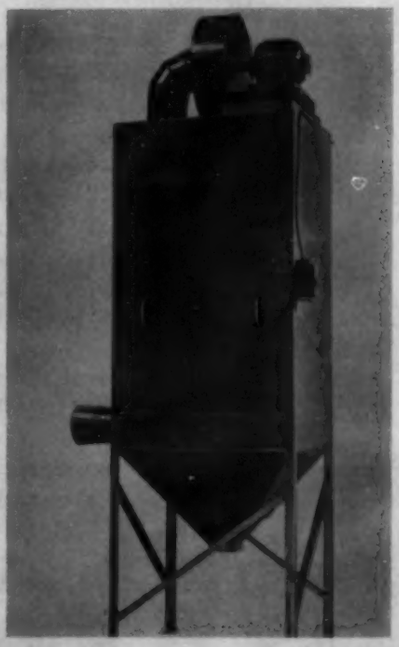
Ernst Magic Carrier Sales Co., 1456 Jefferson avenue, Buffalo, announces a new Drum and barrel carrier designed to handle light wood, fiber, paper barrels and "one trip" light gage steel containers with or without chimes. Its 3-wheel construction automatically balances the load, and its operation can be handled by one man who can attach the clamp, pull down on the handle, lift the container off the floor a few inches, and move it any distance. The carrier features a straight, vertical lift which prevents any flowing over of contents from open-head containers.

Interchangeable Die

Wm. A. Force & Co. Inc., 216 Nichols avenue, Brooklyn, N. Y., announces a new interchangeable die for making precision instrument dials. It is said to do a precision numbering job on aluminum, and locates the markings exactly at the rate of approximately 240 pieces per hour—an increase in production of one hundredfold over a previous method. The die features interchangeable type. This allows replacing single characters or resetting all characters. Die-holder rings are changeable—the same die may be used to mark different dials or to mark the same dial with different spacings. Pilot pins position the work piece radially and concentrically to insure accurate location of the impressions. Bearer bars control depth of impression, and hardened impression pads provide uniform depth of impression. The die is assembled in a hydraulic press. The aluminum dials are fed by hand and stacked, before and after marking, with protective spacers between each piece to avoid scratching or bending. The illustration shows, at right, the die parts ready for assembly; at left, the instrument dial after marking.

Dust Collector

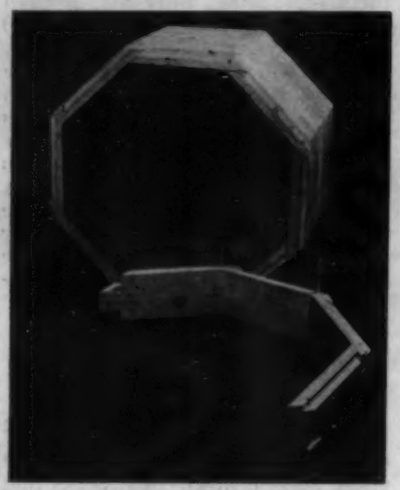
Leiman Bros. Inc., 139-9 Christie street, Newark, N. J., has placed on the market a new dust collector for trapping fine dust. Due to its trapping features, it does not require outdoor connections. The unit, a rectangular metal cabinet affair, embodies from 12 to 66 cloth bags of specially woven cloth especially designed for separating dust from air. In operation the stream of air suction created by a motor-driven suction fan, drawn from the point of dust creation passes through a pipe to the cabinet. As the air passes through the cloth the dust remains on the interior surface of the bags, later to be shaken off by means of the hand shaker attachment. Dust from the bag is collected in a compartment below. According to the



company, much of the dust, especially the heavier particles, never reach the cloth strainer bags, being trapped in this lower compartment because of the slower action of the air there. The compartment may be cleaned at convenient intervals and a removable panel in the cabinet makes it possible to expose and examine the cloth strainer bags. The dust collector may be attached to individual machines or groups of machines such as grinders, polishers, sandblast machines, saws, filers or lathes. The cabinet stands about 9 feet 4 inches, and takes up 23 x 30 inches of floor space.

Substitute Culvert

American Rolling Mill Co., Middletown, O., has designed a new all wood culvert to enable building drainage structures without the use of critical materials. Units are said to "outlast the 5 to 10-year emergency period over which our war effort is presently projected". Accord-



ing to the company, where the culvert is used in a permanent installation, post war replacement can readily be made either by threading a conventional corrugated metal pipe through the wood culvert, or by jacking a metal pipe around it. Because the culvert's construction employs very short lengths of wood, sizes which ordinarily would be discarded are used to make the wooden product. Prefabricated, the culvert is light, easy to handle and assemble at the scene of operations.

"Talking Towels"

Precision Paper Tube Co., 2023 West Charleston street, Chicago, is offering manufacturers "talking towels" for their washrooms. The printed messages on these absorbent papers consist of "hush-hush" cautions against indiscreet talk that

★ It has been said that what goes up must come down. If it's a heavy load, raise and lower it with AMERICAN CHAIN.

AMERICAN CHAIN, because it provides safety, instills confidence in the men who handle the job.

War necessities have brought dangerous responsibilities to many new, untrained men. Give them AMERICAN CHAIN to reduce the accident hazard.

And give them instructions in how to use chain safely and economically. We'll be glad to supply suggestions.

AMERICAN CHAIN DIVISION

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco

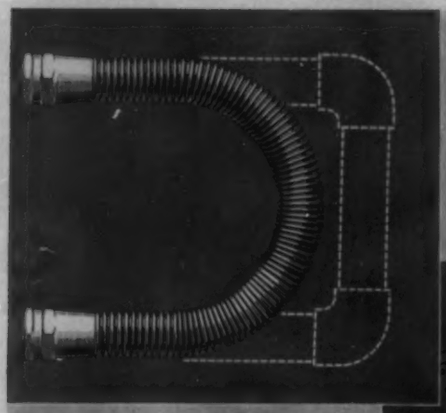
In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT

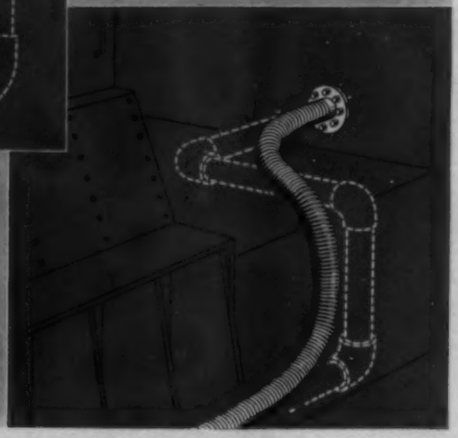
add speed

to assembly, maintenance, repair and temporary hook-ups

Use flexible metal hose . . . for pipe connections where speed of installation is paramount



Rex Flexible Metal Hose can be bent to position by hand and coupled, in a fraction of the time required to fit a pipe connection. ←



Rex Flexible Metal Hose can be "snaked" quickly into place in installations requiring turns, eliminating all intermediate connections. →

Rex Flexible Metal Hose speeds up production, facilitates assembly, reduces down-time. Ask for recommendations on the type of metal hose best suited to your needs from the wide and diverse Chicago Metal Hose production types available.

Use our production capacity to increase your production

Rex-Weld Corrugated Flexible Metal Hose • Rex-Tube Interlocked Flexible Metal Hose • Rex-Flex Stainless Steel Flexible Tubing Avioflex Oil Line Hose • Cellu-lined Hydraulic Hose

CHICAGO METAL HOSE CORPORATION

MAYWOOD, ILLINOIS

Factories: Maywood and Elgin, Illinois

might supply information to an enemy; reminders not to credit nor spread adverse or discouraging rumors about the United States and our allies; rules for safety in work; the necessity of speed-up to help win the war, etc. The towels are dispensed in a white enameled dispenser each towel so folded that

the user can take only one. Though the "talking towels" are about 50 per cent larger than the ordinary, there is a great saving in poundage due to the fact that one towel does the job. The dispenser, which is furnished free, with purchase of towels, is 4¼ inches wide, 4½ inches deep and 12 inches high. Reduction in size from the ordinary is made possible by the towel fold. Any concern buying the towels may have its own "good" propaganda printed on them.

Dynamotors

General Electric Co., Schenectady, N. Y., announces a new line of dynamotors for communication and other service in aircraft, tanks and mobile field equipment. The line comprises five types, ranging from 25 to 600 watts in output and from 3 to 31 pounds in weight. It is said each unit is designed for high output from a small frame size.

Objectionable alternating-current ripple is kept at a value requiring a minimum of filter to provide satisfactory operation of the communication equipment. The dynamotor commutators are cut and undercut so that commutation will meet rigid standards.

End caps are formed aluminum or steel covers which fasten to the end shields to keep out dust and dirt. End shields are of high-pressure cast aluminum or steel. Cartridge-type brush mechanisms are used, and brush holders are anchored in the castings. Capacitors are supplied across the brushes when needed for suppression of radio interference, and brush springs

are shunted with copper pigtails.

Formex wire insulation, light weight, spiraled armature punchings to reduce noise and eliminate locking effect, ball bearings with provision for lubrication and cleaning, and a stator formed from stainless steel tubing are some of the features of these dynamotors.

Lettering and Numbering Machine

Acromark Corp., 9-13 Morrell street, Elizabeth, N. J., announces a new No. 4 lettering and numbering machine for stamping precurved name plates and parts. Its operation is said to be so simple that unskilled workers can manipulate it with accuracy. In operation the curved plate is lifted against the marking dial which is swung to stamp the desired letter, figure or character. By swinging against a ratchet control the name-plate is

advanced for character spacing, and an adjustment screw at the front moves the name-plate forward or backward for line spacing. Prominent characters on the face of the marking dial permit quick selection of desired letters or figures, a pointer indicating the character to be stamped. Plates being stamped are held in position by a quick-setting clamp which holds them firmly. The machine can be furnished for attachment to a work bench or a cast iron pedestal is available if required.

Setting Gage

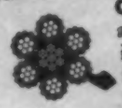
Dearborn Gage Co., 22038 Beech street, Dearborn, Mich., is offering a new Ellstrom internal setting gage (patents applied for) said to eliminate setting instruments and gages by using clamps and parallels with gage blocks. Its gaging surfaces are processed and finished to millionths in flatness, thereby making possible the ultimate in checking with the minimum of adjustment. For example: If the gage is adjusted for 2-inch reading and a 1.875-inch reading is desired, all that is required is to bring a

Now working 24 HOURS PER DAY 7 DAYS PER WEEK

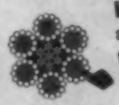
Perhaps you've wondered where you can go for crane ropes which give the continuous, safe service demanded now?

The answer isn't difficult to find. Try Macwhyte's MONARCH Whyte Strand PREformed Crane Ropes. They're strong, tough, and tireless. They've proved their safety. They resist wear and fatigue. They're especially made for today's tough job. AND they're doing that job 24 hours a day, 7 days a week in MANY a plant.

Why are MONARCH Whyte Strand Crane Ropes so efficient, safe? There are many reasons. Here, specifically, are two:



Outer wires of each strand are made with maximum flexibility and toughness to defend them against bending fatigue and abrasive wear.



Inner wires of each strand are the reserve strength of the rope, have maximum tensile strength. This prevents normal wear on outside wires from breaking rope prematurely.

Tell us the make, model, and capacity of your crane... and we'll supply the correct rope for it: Monarch PREformed.

Times like these are times when Macwhyte Atlas Braided Slings are *most* valuable. For they s-p-e-e-d your loads SAFELY day and night.

Macwhyte Atlas Slings are braided from both left-&-right lay endless wire ropes. This unique construction (see illustration) gives them:

1. Perfect balance that eliminates spinning.
2. Extreme flexibility; they handle like a silken rope; resist kinking.
3. No splices to wicker and injure hands.
4. Positive safety of endless wire ropes.

Today American industry is using Macwhyte Atlas Slings to handle pipes, shapes, tanks, bars, armaments, machinery, rolls, etc. These slings can help YOU step up production SAFELY.

We'll be glad to send you helpful rigging bulletins; simply write on your company letterhead.

CRANE ROPES to hoist the load . . . BRAIDED SLINGS to harness it safely. *BUY BOTH FROM*

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MACWHYTE COMPANY

2912 Fourteenth Avenue, Kenosha, Wisconsin — Manufacturers of wire rope to meet every need — Left-&-Right Lay Braided Slings — Stainless Steel Wire Rope — Monel Metal Wire Rope — Aircraft Cable, Aircraft Tie-Rods, "Safe-Lock" Swaged Terminals.
New York Pittsburgh Chicago Ft. Worth San Francisco Portland Seattle. *Distributors throughout U.S.A.*

PROMPT DELIVERY*

"Saved our necks!"

● "Production at full speed by the 10th . . . or else! That was the job that faced us. It meant new materials handling equipment — and a delivery date we could absolutely depend upon. Again, we turned to P&H because we know they won't make a promise they can't keep. This time they beat the promise . . . and enabled us to keep ours!"

★ To meet the urgent need of the war program, P&H guarantees delivery date within ± 3%.

P&H TRAV-LIFT CRANES FOR INTERMITTENT SERVICE

Around production lines, assembly floors, warehouses, loading zones, and in countless other locations, P&H Trav-Lift Cranes provide swift, low-cost materials handling to speed the war effort. Designed for intermittent service, P&H Trav-Lifts are offered in a variety of sizes and types with capacities up to 15 tons. Write for bulletin H-13.

Awarded the Navy "E" for excellence in war production, P&H displays it also as a pledge of future effort.

General Offices: 4411 W. National Avenue . . . Milwaukee, Wisconsin

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

0.125 gage block on the bottom surface of the gage, immediately giving a 1.875-inch check. Another feature of the gage is it can be used either vertically or horizontally. The unit will cover readings up to 6 inches and models can be made to take care of any specific job within a reasonable range. It is adjusted by two thumb screws on each riser. Base of the gage measures 4 x 6½ inches. Its overall height is 12 inches.

Tool Stand

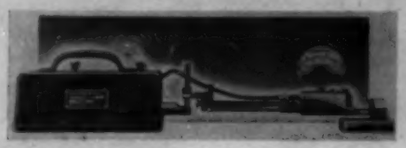
George Scherr Co., 128 Lafayette street, New York, is offering a new tool stand designed to serve as a vise or clamp for holding micrometers, snap gages and other tools. It is said to eliminate the distortion of these instruments due to heat when held in the hand. The tool stand is so constructed that the

micrometer or snap gage may be held securely without damage to the finish of the frame. Its jaws are parallel, and do not have serrations. A small piece of scotch tape on the inside will hold the tool firmly without exerting too much pressure. Also, the jaws may be swiveled from vertical position to horizontal. Use of the unit is said to speed up production inasmuch as it frees both of the worker's hands.

Surface Finish Tracer

Physicists Research Co., 343 South Main street, Ann Arbor, Mich., announces a new type V Mototrace, an accessory used with the profilometer for mechanical tracing of surface finishes. Differing from the former model, it operates by means of a 9-watt driving motor. This allows the unit a stroke of 1/32 to 2¾-inch in length. Besides a long trace, the former "dead spot" from ⅛ to ⅝-inch is eliminated, allowing contin-

uously adjustable setting. In addition, provisions have been made so that, if the motor should become locked, it does not heat up. The new unit, shown in use with the



type I (internal) tracer and profilometer, also features fewer controls than the previous model, operations being controlled by the power switch and two adjustable stops.

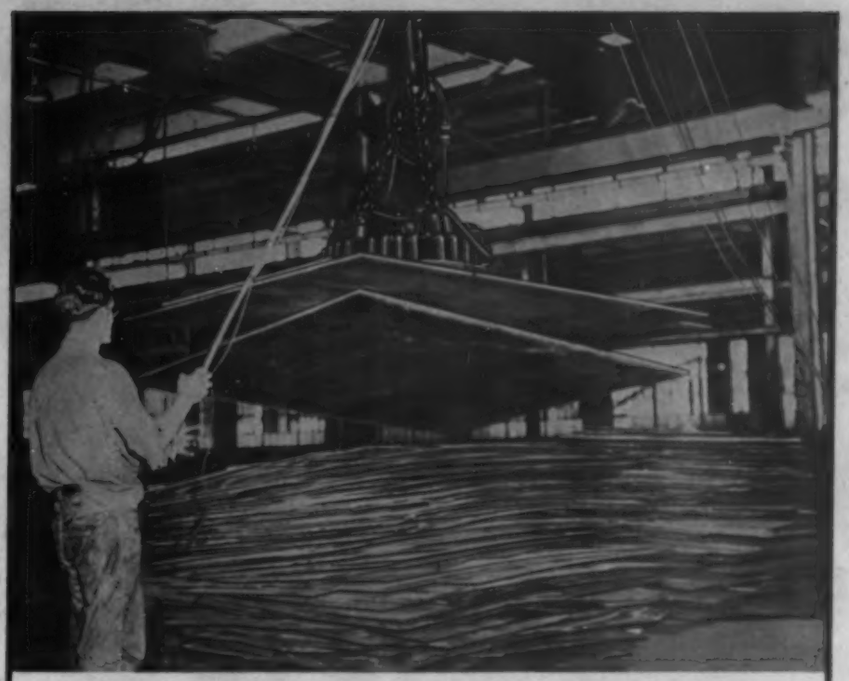
Plate Side Trimming And Slitting Unit

Streine Tool & Mfg. Co., New Bremen, O., announces new heavy plate side trimming and slitting units having maximum capacity to side trim or slit ¾-inch thick by 10 feet wide steel, aluminum, brass and other nonferrous metals. Each features a patented continuous hold-down feed, and delivery conveyors which enable the operator to shear plates or sheets with a minimum of camber. The conveyor slats of each unit are covered so that highly polished plates or sheets can be sheared successfully without marring their surfaces. Each slitter is equipped with two housings which can be adjusted simultaneously or separately — electrically. It also

has a revolving scrap cutter. The trimmer can be used in connection with the company's patented double end cut shears, and when used in this connection is known as the plate slitter resquaring unit and has the capacity to resquare plates ¾-inch thick, 10 feet wide and 30 feet long.

Self-Aligning Idler

Chain Belt Co., 1600 West Bruce street, Milwaukee, announces a new self-aligning idler for flat conveyor belts, both return and carrying, which will help to keep the belt centralized on its supporting idlers. Operation of the idler is sensitive and instantaneous. If the belt runs to one side it has a tendency to swivel the idler in a horizontal plane. If this in itself is not sufficient to cause the idler to swing enough to force the belt to throw



UNLOADS—SORTS and MAKES-UP ORDERS FASTER and SAFER with EC&M LIFTING MAGNET

TO speed up both incoming and outgoing shipments of steel plates, this company has found that an EC&M Type SA Lifting Magnet does these tasks quickly and safely. All manual labor with plate handling has been eliminated.

There is no lost time in prying apart plates to affix chains—no danger of crowbar or chain slippage.

Sorting plates into piles as well as making up orders is also quickly accomplished. Single plates may be picked up or two or more plates may be lifted as needed. If more than the required number are lifted, the operator, by rapidly manipulating his master switch controlling the EC&M Automatic-Discharge Magnet Controller, has become skilled in dropping off plates one at a time until the lift contains the required number.

This is only one of the many ways in which EC&M Type SA Lifting Magnets help speed defense operations. Write for 18-page illustrated Bulletin 900 showing them at work. Fill out the convenient coupon below for your copy and mail it today.

THE ELECTRIC CONTROLLER & MFG. CO. CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

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Gentlemen:
Please send me a copy of illustrated Bulletin 900 describing EC&M LIFTING MAGNETS.

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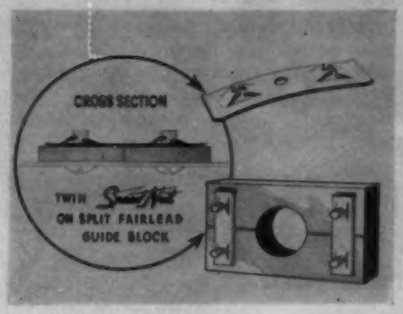
back immediately, the belt will continue traveling to one side until it contacts the counterweighted end disk, which is slightly larger in diameter than the idler roll. Contact with the counterweight tends to rotate it, but since it is a counterweight it resists this tendency to rotate and produces a counterforce on the idler. This causes the idler to swivel rapidly, throwing the idler more out of line which then immediately forces the belt to swing back the other way. No side guide rolls are included on the idler. Where excessive misalignment of a belt exists, self-aligning idlers spaced at intervals between the stationary idlers will automatically bring the belt back to the central position.

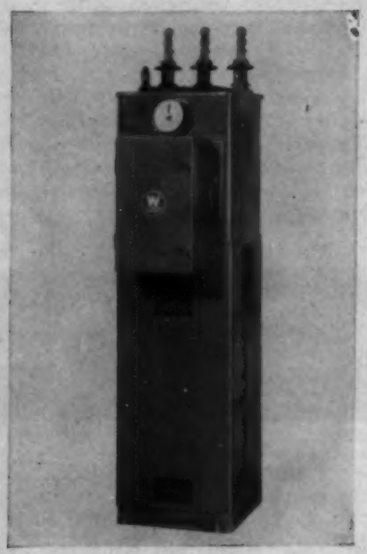
Twin-Type Nuts

Tinnerman Products Inc., 2039 Fulton road, Cleveland, has introduced new twin-type Speed nuts designed to reduce both weight and assembly time for attachment of fairlead guide blocks. It is said only a screw driver is needed for this assembly. The nut also is designed for use on other attachments throughout a plane where fastening points are grouped in pairs. It is manufactured with or without center hole for riveting. Nuts are offered in the following sizes which indicate distance from center to center of screw holes: ½, ⅝, ¾, ⅞ and 1-inch for either AN 515-6 and 8 or Air Corps 530-6 and 8 screws.

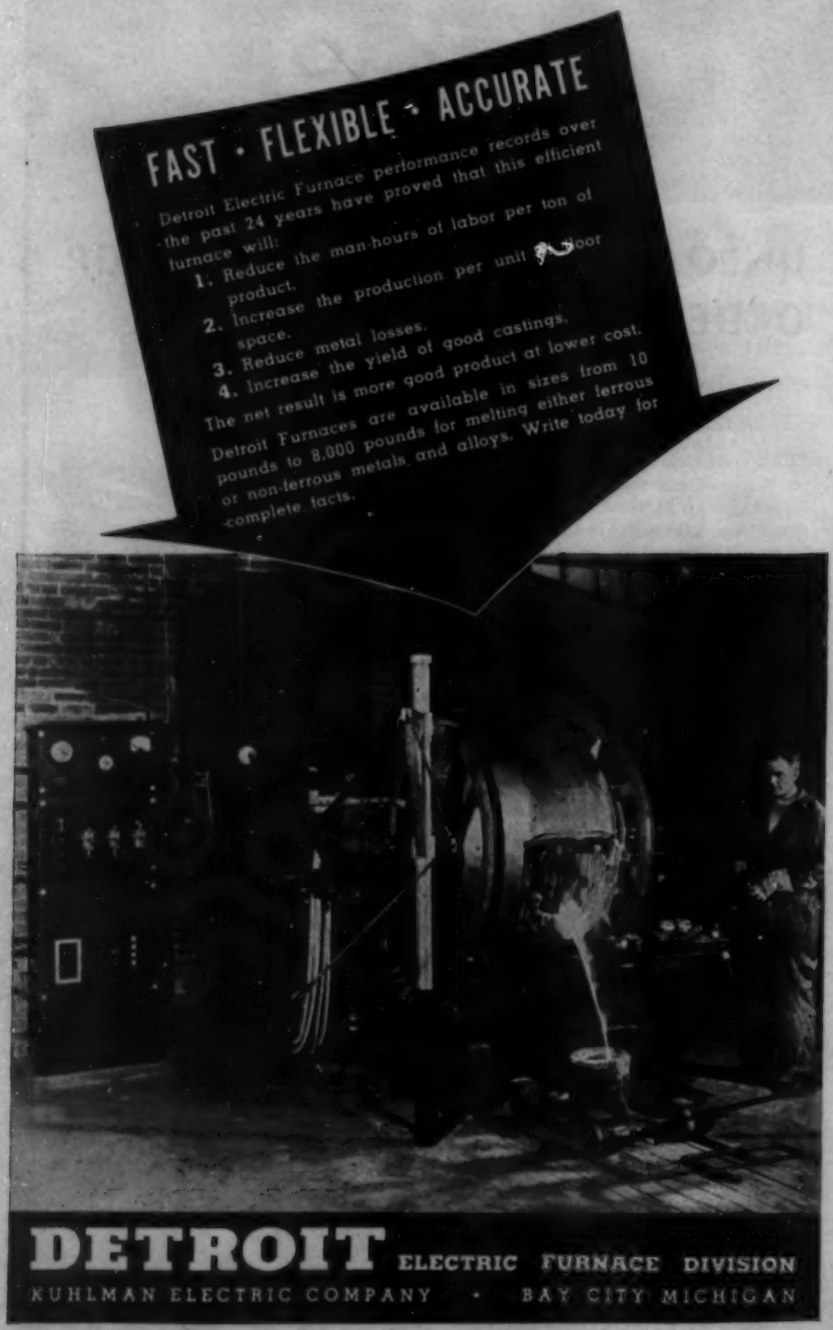


Voltage Regulator

Westinghouse Electric & Mfg., Co., East Pittsburgh, Pa., announces a new air-cooled voltage regulator for indoor use especially designed for feeder circuits where exacting voltage regulation requirements must be met, and liquid cooling is undesirable. Known as type SA, it is intended for single phase feeders, 2400 volts, 50 to 300 amperes and 4800 volts, 25 to 150 amperes. The regulator does not require liquid cooling, and its winding insulation



is flame resisting to reduce hazard from fire or electrical failure. For low maintenance and continuity of service, a new design of voltage regulating relay incorporated eliminates the usual assembly of delicate pivots, pins, and springs. Separate transformers prevent operation of the motor from affecting the relay. Outside air entering through two openings on each side of the regulator provides the cooling. Although operating on the transformer principle the general construction of the unit resembles an induction motor. It has a stator and rotor, with the primary or shunt winding wound on the rotor and the secondary or series winding on the stator.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Detroit Electric Furnace performance records over the past 24 years have proved that this efficient furnace will:
1. Reduce the man-hours of labor per ton of product.
2. Increase the production per unit floor space.
3. Reduce metal losses.
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The net result is more good product at lower cost.
Detroit Furnaces are available in sizes from 10 pounds to 8,000 pounds for melting either ferrous or non-ferrous metals and alloys. Write today for complete facts.
DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

Plating Industry

(*Continued from Page 72*)

and use the space thus saved for other manufacturing operations which will increase the plant output.

—See that present plating plants have good technical advice and laboratory facilities.

—See that sensible specifications are written, and train the inspectors according to scientific facts.

—Use the different organizations, technical groups and periodicals in the field. These organizations are anxious to help and will do their part. The men in the field are generally sincere and will be glad to co-operate.

—A job of national organization is the best solution. This can be accomplished within reason and in a reasonable time.

—Do not expect the impossible overnight.

One might ask just what can be done in the metal finishing shops. Table I is an outline showing many of the operations performed in electroplating plants. To be sure, all of the operations are not done in all plants. However, due to the small units in many instances, the plants can be converted on short notice. In many instances the plants have casting divisions which are capable of producing slush metal castings of low-melting-point alloys. By looking over the outline one can see the diversity of operations performed. With such a broad expanse it is readily seen that the industry can be extremely useful in the war manufacturing effort.

Several different types of organizations have been contacted and asked for an expression on the conversion of the electroplating industry to the war effort. Comments are:

Societies:

Electrochemical Society: "This organization is ready to aid the plating industry in converting its facilities to the war effort."

Publications:

Metal Finishing: "We are willing to aid the industry in doing more and better work for our Army and Navy."

Schools:

The Institute of Electrochemistry and Metallurgy: "The facilities of the institute are at the command of the plating industry."

Consulting Houses:

Platers' Research Co. and Platers' Technical Service Co., New York: "We will be pleased to aid the plating industry in any reasonable way."

Master Electroplaters' Associa-

BIRTH OF AN ENEMY

Today, even the smallest spark is your potential enemy.

For today, once fire is born it may destroy machinery impossible for you to replace. It may destroy defense materials sorely needed by a hard-pressed nation.

That is why today, as never before, we urge you to seek out and eliminate every *source* of fire. But this alone is not enough.

All-important is to be prepared to put out fires that can and *do* start . . . immediately, automatically, *at the source!* That is the first rule of fire-fighting. And expert fire-fighters the country over will tell you no system will accomplish this more surely—more reliably—and with less water damage than a Grinnell Automatic Sprinkler System.

Grinnell Sprinkler Systems have such a record of trustworthy performance, that they quickly pay for themselves in reduced insurance premiums . . . then return them "cash dividends".

Built as a complete system by the world's leader in fire protection, a Grinnell System is prefabricated to an engineered layout to meet your special requirements, then installed with minimum disruption. Owners of fifty billion dollars worth of property say it's the best guardian of production and storage. Don't wait until it is too late. Write Grinnell Company, Inc., Executive Offices, Providence, R. I. Branch offices in principal cities.

Where Fires May Be Born in YOUR Plant

1 *At cables with combustible insulation.*
2 *At worn or frayed electrical cords.*
3 *At switches with loose connections.*
4 *Where welding is unsupervised.*
5 *Where open flames are used.*
6 *Where static is generated near flammable vapors.*
7 *At bridged fuses.*
8 *Where sparks are not confined.*
9 *At improperly oiled bearings.*
10 *Where workmen are careless with matches, cigarettes.*
11 *Where spontaneous ignition is possible.*
12 *At dirty flues and ducts.*
13 *At dirty, oily or overloaded motors.*
14 *Where light bulbs contact combustibles.*
15 *Where flammables are used for washing machine parts.*

GRINNELL
AUTOMATIC SPRINKLERS
For Production Protection

tion of New York: "We are behind such a movement."

Of course, there are other organizations which would help such a movement, but it was not possible to contact all of them.

It should be pointed out that plating can be substituted for certain operations which have to do with the depositing of a metallic surface upon metallic objects and in so doing, metal can be saved. For instance, it has been shown that electro-tin deposits of a given thickness have fewer pores per unit area than the same thickness of tin produced by hot dipping. Thus, it is possible to conserve tin by substituting the electroplating method. Already this is being done widely.

Undoubtedly there are other examples—use of steel protected by a flexible electroplated coating of silver or special alloys put on before fabrication is one of the newer developments. Such savings are of tremendous importance. Thus, the plating industry can be used to do more and better work if it is properly organized.

In converting commercial metal finishing plants to the war effort, it is possible to establish centers throughout the country using as a basis the branches of the American Electroplaters' Society. It might also be pointed out that the centers of plating can be reached through key cities such as New York, Philadelphia, Baltimore, Boston, Cleveland, Chicago, Los Angeles, New Haven or Waterbury, Providence, St. Louis and Atlanta or Nashville.

The question now might well be asked, *how can the plating plants help themselves?* Remember the man who called his sons to him and then gave them a bunch of sticks tied together asking that they break the bundle. After all had tried and failed, the father untied the mass and gave each son a stick, which they broke with ease. The old adage of "united we stand, divided we fall" holds here as well as elesewhere. There is strength in unity.

It is believed that finishing plants should become associated in order to obtain work. The reason for this is obvious when one considers that the plating plant is only a division of a manufacturing unit and therefore does not manufacture a completed part. The industry only treats the surface of that which has been formed, stamped, etc., in other independent operations. For this reason the plating plant by itself cannot hope to obtain prime contracts but by necessity becomes a subcontractor.

The only way out of this dilemma is to form a vertical pool. This dictates the places where contracts can be obtained. How can the names of the companies holding large contracts which require plating be secured? This as well as other valuable information and aid can be obtained through your local office of Bureau of Field Operations, War Production Board (listed in STEEL, April 20, 1942, Section Two, p. 26). It is not necessary to go to Washington for help as there are 115 field offices of WPB throughout the country. The offices know the companies holding war contracts, and they are willing and ready to aid any plant.

Obviously a lot of buck passing will be encountered. One man who has been working on this problem has made a number of trips between New York and Washington trying to find "where, who and what". Don't go to Washington! If each job shop tries to line up work, a terrific amount of wasted energy will result. The logical solution is for one man to do all the contact work for the group and keep everyone posted as to the demands, etc. Such a person could be kept busy doing a good job. He would become known to those in charge of subcontracting work and many useless trips eliminated. To work such a plan, the group must be organized to pro-rate expenses and work. Such an organization is possible and should be a reality. The sooner it is organized, the

Handling FERROMANGANESE from cars to stock pile this Blaw-Knox Bucket unloads an average of 7 cars per eight hour shift. The former cost of $.65 per ton was *reduced* to $.25 per ton.

This bucket handles LIMESTONE in pieces ranging from 6" to 12" from dock to 50-60 ton gondola, filling car in an average time of 20 minutes.

It unloads SPIEGEL from 50-60 ton car in 1½ hours without teeth, and handles PIG IRON from stock pile at the rate of about ¾ Cu. Yds. per grab.

Blaw-Knox Buckets are designed to meet Steel Mill requirements—put your bucket problems up to Blaw-Knox.

BLAW-KNOX
Digging and Rehandling
BUCKETS
BLAW-KNOX DIVISION
• OF BLAW-KNOX CO. •
Farmers Bank Bldg. Pittsburgh, Pa.

sooner the plating industry will be converted to the war effort. Obviously such an organization to be completely effective should be national in its scope.

It might be pointed out that a group of plating plants in the New York area have done just this very thing on a small scale. They have formed a pool and have recently placed bids on large amounts of work.

The group has only one man who does most of the contact work and keeps the various members informed as to new contracts, methods to use, etc.

On talking with some WPB officials several items of importance were pointed out concerning the formation of and the various kinds of pools. A horizontal pool is one in which all the members perform the same operation.

However, a vertical pool—one in which the different members perform different operations—would not violate anti-trust laws. Thus, one manufacturer may do stamping, another welding, while the third does plating. It will be seen immediately that this would make it possible for the pool to become a prime contractor as well as a subcontractor.

This is important and should be fully considered by any group being organized. It is believed that such vertical pools can be formed just as easily as the other type and they will probably serve more effectively in getting war work.

Government Contracts

(*Continued from Page* 80)

authorization or advice from the contracting officer as to the possibility of reimbursement. The contracting officer is not bound to give an abstract opinion of this sort, but he will usually advise if it is clearly *not* reimbursable.

If his opinion leans toward reimbursement, he may suggest that the expense be incurred and a voucher placed in proper channels for advance decision of the comptroller general. Comptroller general's decisions in advance of final settlement may be requested either by a disbursing officer or a contracting officer. While they may be obtained only after an expense is incurred and a voucher placed in proper channels, you will then know where you stand and may change your operating methods to cut out whatever proves to be a nonreimbursable cost.

All the supporting documentary evidence and statements available should be attached to the voucher.

Guides to Reimbursable Costs: Doubtful items demand caution. In requesting reimbursement, cite specific authority if possible. Reimbursement should not be requested under one of the general "catch-all" provisions of the contract except as a last resort. While no fixed set of rules exists as to what may be considered as allowable costs, certain guides do exist. These should be used in framing arguments for presentation to the contracting officer. They are:

—The contract is the "bill of rights" insofar as reimbursement of costs is concerned, since items specifically allowable under the contract will not later be disallowed.

—Comptroller general and comptroller of the treasury decisions are reliable but do not provide many clear precedents because decisions of the past 18 months are the only ones arising from the true "fixed-fee" contract and there has not yet been time for a representative group of decisions to be made. Decisions rendered in connection with World war contracts concerned provisions of the old cost-plus-a-*percentage*-of-cost contracts which differed in many respects from the present *fixed-fee* contracts.

—Decisions of the Board of Contract Adjustments (War Department) made during the first World war are subject to the same objec-

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YES . . . for all practical purposes, Harper's fastenings are everlasting. They resist rust, corrosion and other destructive conditions . . . last as long as anything they are made to fasten.
For uses carrying adequate priorities, Harper can furnish bolts, nuts, screws, washers, rivets and accessories made of brass, bronze, Everdur, Monel and stainless steel.
4320 Stock Items
Many are rare and "hard to get." Well-equipped special order department maintained to manufacture fastenings according to specifications. Illustrated catalog free to executives in war and other essential industries. The H. M. Harper Co., 2646 Fletcher Street, Chicago, Illinois.
Eastern Office, 45 West Broadway, N. Y. C.
HARPER Chicago
EVERLASTING FASTENINGS

tions that are directed against the comptroller of the treasury decisions, but they are a good guide because of their vast scope. Even more important is the fact that the War Department will use these decisions advisedly in deciding reimbursement questions on their construction and architect-engineer "fixed-fee" contracts.

—Court decisions also refer to the old "cost-plus-a-percentage" contracts but are important for the number of reversals of the comptroller's decisions, indicating that the powers of the comptroller's office have frequently been exceeded.

—Navy regulations have been issued for Navy cost inspectors, laying down principles to be followed in allowing reimbursement of cost and stipulating the cost records to be kept by contractors. A study of these regulations will help both Army and Navy contractors very greatly.

—Treasury decision 5000 is a tax ruling defining allowable costs under the Vinson act which taxed at 100 per cent profits on Navy contracts and Army Air Corps contracts in excess of a percentage of cost. Although this decision is in no way binding upon the terms of the contract, it is important as a guide because of its detailed analysis of each cost item from an accounting standpoint. T.D.-5000 and possible future amendments which may be made to the regulation prior to final settlement of a contract are specifically taken as a basis for determining reimbursement under the present Army Air Corps fixed-fee contract.

Checklists of Reimbursable and Non-Reimbursable Costs: These checklists, Tables II and III, are intended only as an indication to the contractor of the attitude which the government *may* adopt toward the items of cost listed. While the listed items were allowed in the cases cited, your job, your contract or circumstances surrounding your expenditure may create a different situation leading to a different result. *The importance of consulting your lawyer and accountant with respect to cost provisions in the contract cannot be overemphasized here.*

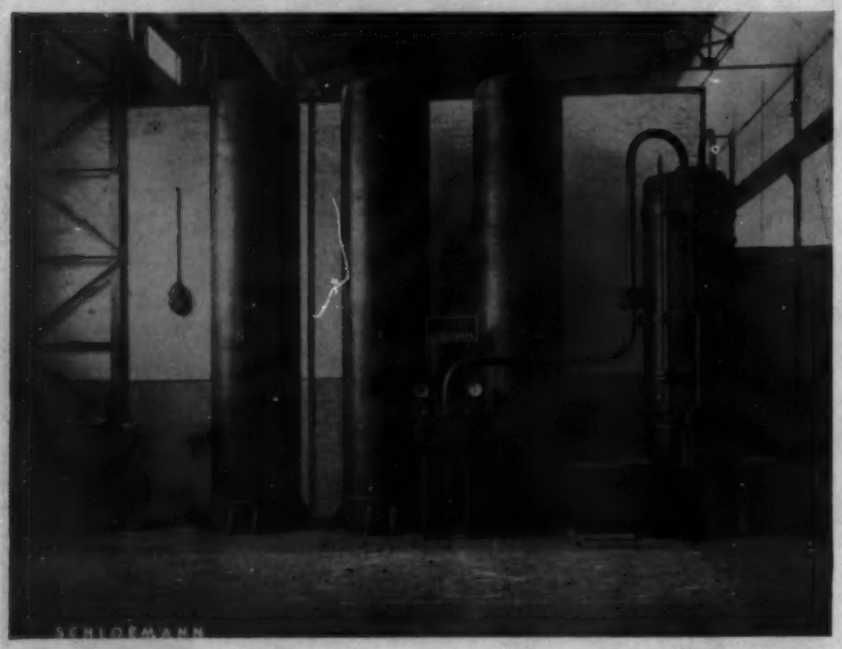
Your accountant will ferret out each of your cost items and provide you with the factual argument necessary to convince government officials to make provision for a specific item of cost in the contract or to convince them of the justice of allowing an item not specifically mentioned under the usual blanket clause providing for reimbursement of such non-enumerated items of cost as should, in the opinion of the contracting officer, be included in the cost of the work.

Your lawyer will see to it that the cost provisions in the contract are phrased to allow all proper and anticipated elements involved in performing the contract, and will organize and present to the government in clear and concise fashion the facts marshaled by your accountant. While government officials wish to be fair to the contractor, they properly insist that they be provided with reasons for allowing a cost item in proper evidentiary form.

With respect to items of cost not enumerated in the contract, your attention is again directed to the wisdom of taking advantage of the provision found in most contracts permitting the certification of costs by the contracting officer prior to the actual incurrence of the expense.

To be on the safe side, the contractor should, whenever possible, negotiate with the contracting officer for the allowance of the item as a reimbursable cost *before incurring the cost.*

By clearing contemplated expenditures with the controlling officer or his representative, a contractor will be able to keep the closest possible control over expenses and hedge against having his fee eaten up by non-reimbursable expenses.



AIR-HYDRAULIC ACCUMULATOR

SCHLOEMANN Air-Hydraulic Accumulators are completely automatic. Fundamentally they consist of a Water Container, an Air Container and Electrically Controlled Regulating Apparatus.

The control of the water at the highest and lowest levels is by means of switches operated by floats contained in chambers of a communicating tube of the water bottle. The switch in the upper chamber controls the operation of the pump while that in the lower chamber controls the check valve which shuts off the accumulator at low water level.

● HYDRAULIC PRESSES ● EXTRUSION PRESSES
● HIGH PRESSURE PUMPS - DOUBLE ACTING DUPLEX TYPE
● ENGINEERING OF COMPLETE HYDRAULIC SYSTEMS

SCHLOEMANN
ENGINEERING CORP. PITTSBURGH, PA.
Rolling Mill Machinery Hydraulic Presses

Flame Descaling

(*Concluded from Page* 88)

turer of welded cable reels that required complete cleaning before painting. A sudden increase in business has severely overtaxed the sandblasting department, and purchase of additional sandblasting equipment and air compressors would have required an outlay of approximately $6000. It was found that the oxyacetylene flame would remove practically all of the weld flux quickly and economically. That which remained was left mostly as scale in undercuts and low spots, and was removed by sandblasting. This company claims the use of flame-descaling has reduced sandblasting time 80 per cent, with resulting increase in production. Other users report the process has been adopted for 100 per cent flux removal.

* * * * *

So far the results achieved in a relatively short time with this recently introduced flame-descaling process have been extremely valuable, and indicate that there is a tremendous future for this unique application of the oxyacetylene flame. The process has definitely proved its worth by reducing descaling time and costs, and by removing scale in some instances where it never could be removed satisfactorily before by any other method.

Spot Welding Speeds Assembly of Bearings

An improved method of installing the roller retaining rings of quill bearings by spot welding not only gives a sturdier, more permanent assembly, but more important, speeds up production of this antifriction unit considerably, it is reported.

According to Bantam Bearings Corp., South Bend, Ind., the manufacturer, spot welding is simplifying the machining operation—thus speeding assembly. In addition, it gives a positively located and permanently placed band which will not snap loose under any ordinary conditions.

Improved Ductwork Releases Steel for War

Formdux, an improved ductwork which uses only 20 per cent of the metal usually required in ducts for forced-air furnaces, is announced by Airtemp Division, Chrysler Corp., Dayton, O. The duct system is said to save 4 out of 5 pounds of the metal previously used.

Importance of this new ductwork is realized considering that some 300,000 of the low-cost, war workers' homes called for by the government's 1942 housing program must be heated with warm-air furnaces.

Normal metal ductwork requirement for each of these homes would average 458 pounds of sheet steel. The new development reduces the steel requirements in the average home to 81 pounds—a saving of 377 pounds per home or some 113,000,000 pounds—over 56,000 tons of steel.

Formdux sheets are said to have high tensile strength and are completely fireproof. They have a high insulating quality which conserves fuel and a low resistance to the flow of air.

Issues Manual on Carbon Steel Products

American Iron and Steel Institute, 350 Fifth avenue, New York, recently issued another steel products manual—section 2 on "Carbon Steel Semifinished Products." It includes definitions, classifications, manufacturing practice and other engineering data.

14 Ton Blooming Mill Driving Spindle Repaired by Thermit Welding. Risers and Gates are Still in Place.

14 TON DRIVING SPINDLE Reclaimed by THERMIT WELDING

The practice of repairing heavy units by Thermit welding, which is almost universal in the iron and steel industry, can be adopted to great advantage by any firm which uses large, heavy parts in its manufacturing or production processes.

Many days of priceless production time can be saved in Thermit welding parts such as crankshafts, machine frames, large gears—days which will ultimately mean more guns, tanks and other armaments for our far flung fighting forces.

Thermit welding is used for fabricating heavy units, too. Welding time is less than that of other methods, stress relieving or positioning are not necessary, and the time and expense of preparing large intricate castings are eliminated.

Send for booklet, "Thermit Welding" which explains many interesting applications.

METAL & THERMIT CORPORATION
120 BROADWAY
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Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

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Greater Use of Old Equipment Urged At War Engineering Conference

NEWARK, N. J.

WITH deliveries far extended on new equipment, American industry should and can utilize to a much greater extent the old and simpler types of machinery on hand. In various cases work can be done effectively, and, above all, such utilization will provide added machining capacity.

This general view was emphasized at the War Production Conference here, May 29. Sponsored by 14 engineering organizations at the request of the War Production Board, it comprised a general meeting in the afternoon; a dinner, at which W. H. Harrison, director of production, WPB, Washington, was principal speaker; and various panels in the evening, relating, respectively, to ordnance inspection; machinery; metallurgy, substitutes, chemical equipment and plant safety; electrical equipment; welding; and castings.

Stressing the need for using old equipment, George T. Trundle Jr., president, Trundle Engineering Co., Cleveland, stated records will show that machinery equipment in plants today will average 10 years or older. He doubted if there has been any great change in the fundamental effectiveness of design. He had much to say for the single purpose machine, which is relatively simple and which any man or woman can learn to operate in a fairly short time.

The speaker also believed that many companies would not find it so difficult to get war work if they just sold themselves properly.

Rapid progress of conversion of industry in the New York Ordnance District, comprising northern New Jersey and southern New York, was revealed by Col. J. K. Clement, deputy district chief, U. S. Army.

In performing contracts, there are three steps of particular importance, he said. First, there should be complete and detailed planning of requirements. This covers, the speaker said, not only all materials, component parts and machine tools, but every jig, fixture, tool and manufacturing aid required for complete production, and all labor and transportation needed. Second, all these items should be set into a time schedule; and, third, there should be full production control.

Shortage of Jewel Bearings

The arts and skills of 73 different trades or crafts are involved in the building of a complete airplane, K. A. MacDonald, eastern procurement district, U. S. Army Air Force, asserted, in discussing shop problems in that industry. The aircraft manufacturer of today, he said, attempts to turn his plant, in so far as is possible, into an assembly plant, and sublet as many of the parts as he can.

Airplane instruments have always been difficult to make, Col. MacDonald declared.

One of the first problems in connection with this fast expanding demand for instruments was the shortage of jewel bearings, which largely had been imported from Europe. To top this problem, they expanded the country's small jewel bearing industry and also substituted other types and kinds of bearings. Another difficulty had to do with the manufacture of small pinions, shafts, springs and other small parts. This was finally overcome by augmenting the supply of the small, delicately adjusted machine required, and training men for this particular work who were otherwise already highly skilled mechanics.

Shortage of skilled mechanics on

(*Please turn to Page* 119)

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

"AMERICA, HURRY!"

Pearl Harbor! Wake Island! Singapore! BATAAN! MANDALAY! CORREGIDOR!! Lost--because we sent "too little, too late".

TANKS, PLANES, SHIPS, GUNS, SHELLS AND BOMBS are the sinews of war. If not produced in countless numbers —TODAY AND TOMORROW—THE WAR MAY SOON BE LOST! AMERICA, HURRY!!

***SPEED* PRODUCTION! *SPEED* DELIVERIES! *SPEED* SHIPMENTS!**

★ HOW? Let Pangborn show you. Show you the vital services the ROTOBLAST Barrels, Tables and Cabinets—the Air Blast Rooms, Cabinets and Special Equipment—the Dust Collectors and Control systems are performing for others daily.

★ One ROTOBLAST Barrel just installed replaces twenty-three tumbling mills—and in eight hours cleans more work than the combined mills turned out in twenty-four—and does the job BETTER—at a LOWER COST.

★ A ROTOBLAST Table cuts cleaning time on fragile work 50 percent—ELIMINATING THE WASTE THAT FORMERLY CAME FROM REJECTS DUE TO BREAKAGE AND WARPAGE.

★ A manufacturer of bombs finds it easy to clean the inside and outside of these weapons since he asked Pangborn to help him—AND NOW HIS PRODUCTION IS THREE TIMES WHAT IT USED TO BE.

★ Pangborn technical, sales and research facilities are available to help you SPEED UP PRODUCTION—the benefits of thirty-eight years experience as the World's largest manufacturer of Blast Cleaning and Dust Control equipment are yours for the asking. Use Pangborn help to get MORE OF EVERYTHING MADE OF METAL TO THE YANKS.

THE WAR WON'T WAIT!

AMERICA, *HURRY!!*

PANGBORN

WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT

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Are you struggling for MORE MACHINE OUTPUT?

HOW ABOUT MODERN MOTOR CONTROLS?

These are times when split seconds count up. Multiply split-second savings by thousands of machine operations . . . and you get an extra bomber, several tanks, or many more shells.

If you are struggling for more machine output, see that your motor controls are designed to get highest efficiency from operator and machine. Specify Allen-Bradley solenoid controls because they are not only consistent and accurate in their operating cycle . . . they are maintenance-free. There is only one moving part. No pivots, pins, or hinges to stick. No flexible jumpers to replace. No cleaning, dressing, or filing of contacts.

Allen-Bradley motor controls are available in single units in nine kinds of enclosures or assembled in complete panels for any multi-motored machine. Write for catalog, today.

A COMPLETE LINE OF CONTROLS FOR ALL TYPES OF MACHINES

Complete Panels | Automatic | Manual | Combination | Push Buttons | Reversing | Relays | Drums | Multispeed

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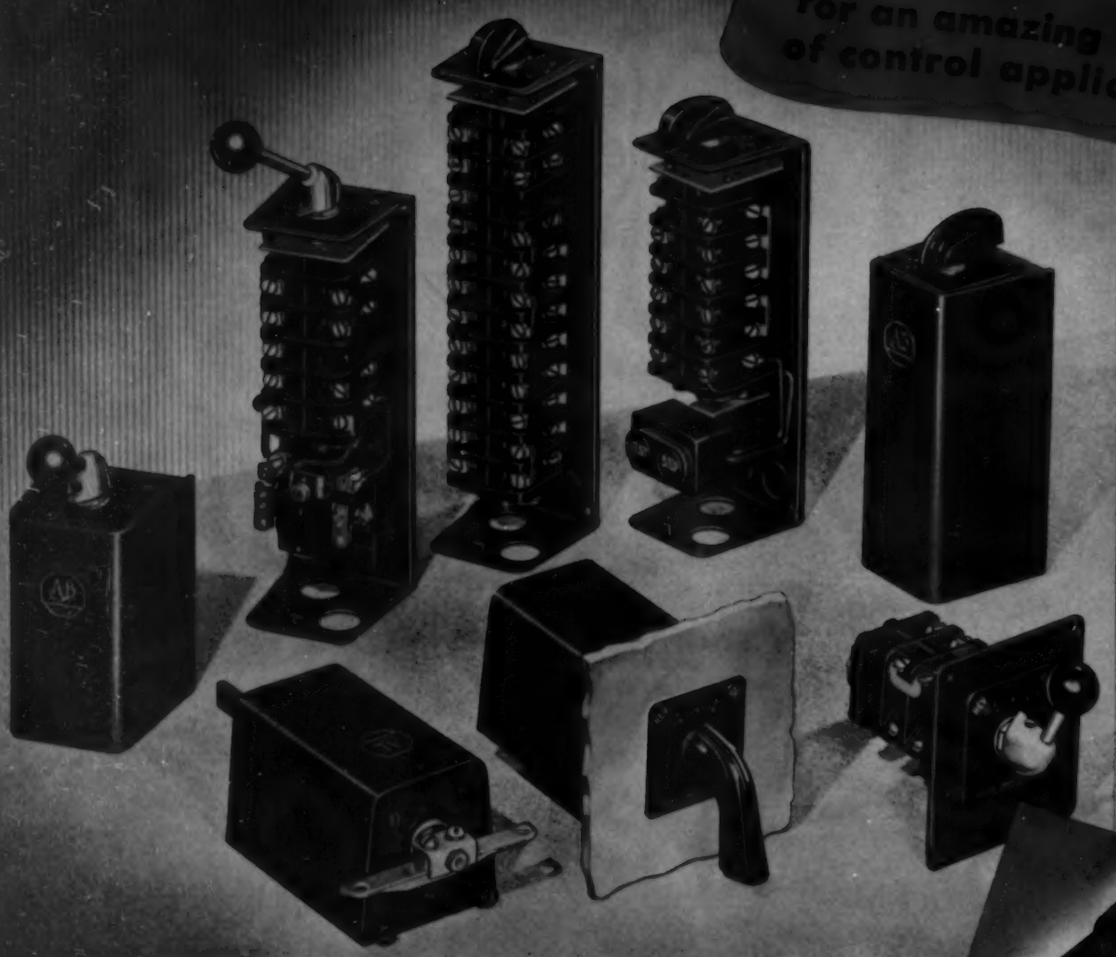
MOTOR CONTROLS FOR ALL INDUSTRIES

QUALITY

A Line of SMALL DRUM SWITCHES

for an amazing variety of control applications



A FEW BULLETIN 353 DRUM SWITCH COMBINATIONS

The diagrams below illustrate a few of the large variety of switching combinations available with Bulletin 353 Drum Switches.

REVERSING SWITCH

2 SPEED SWITCHES

3 AND 4 SPEED SWITCHES

Many new and important units have been added to the popular Bulletin 353 line of small drum switches. These drum switches are now available with built-in push buttons; with electrical interlock for controlling magnetic main line switches; with a lever for rope operation. The individual switching units, with silver alloy contacts, permit an amazing range of contact arrangements. For full details, write for Bulletin 353 and price sheet.

Allen-Bradley Company, 1320 S. Second St., Milwaukee, Wis.

SECTIONAL UNIT SHOWING CONTACT

The Bulletin 353 Drum Switch is a vertical assembly of individual switching units, each with its own contact arrangement and switching cam. There are no contact segments on the revolving shaft.

ALLEN-BRADLEY

BULLETIN 353 SMALL DRUM SWITCHES

Greater Use of Old Equipment Urged

(*Concluded from Page* 116)

general instrument work is being rapidly overcome and to a considerable extent, the speaker said, by the employment of selected women workers.

To save aluminum and also economize on much needed hammer capacity in forge shops, steel propellers, with hollow steel blades, were proposed. But this presented problems. For instance, the steel blades are welded together from sheets, and the heat of welding tends to warp the materials; also annealing, with subsequent aligning and straightening, and final finishing to exact balance and accuracy of curvature presents a big problem before the final X-ray examination for possible flaws in the welding seams.

Research Body Studies War-Time Problems

The position which 2300 industrial research laboratories in the United States occupy as a reservoir of ideas, organized scientific knowledge, and in providing special facilities for solution of new technical problems growing out of the war, was considered at the fourth annual meeting of the Industrial Research Institute in Cleveland recently. More than 50 industrial executives and research directors participated in roundtable discussions which dealt chiefly with adjustment of research programs and personnel to war conditions.

H. S. Benson, administrative engineer, research division, United Shoe Machinery Corp., Beverly, Mass., was elected chairman, succeeding F. W. Blair, chemical director, Procter & Gamble Co., Ivorydale, O. William R. Hainsworth, vice president, Servel Inc., New York, was named vice chairman.

Two new members of the executive committee for three-year terms are Philip W. Pillsbury, president, Pillsbury Flour Mills Co., Minneapolis; and Harold K. Work, manager of research and development, Jones & Laughlin Steel Corp., Pittsburgh.

Continuing on the executive committee are: Retiring Chairman Blair; Caryl P. Haskins, president, Haskins Laboratories, New York; Maurice Holland, division of engineering and industrial research, National Research Council, New York; and R. C. Newton, vice president, Swift & Co., Chicago. C. G. Worthington, 8 South Michigan avenue, Chicago is secretary of the institute.

An affiliate of the National Research Council, the institute undertakes to promote improvement of methods and more economical and effective management in industrial research through co-operative effort of its members. Membership is composed of 45 industrial concerns maintaining research laboratories.

Declares Air Conditioning Will Raise Steel Output

Enough extra steel every four months to build a battleship can be obtained by air conditioning a single blast furnace, according to Russell V. D. Dunne, engineer for Carrier Corp., Syracuse, N. Y. He estimates provision of "dry blast" air conditioning for 50 blast furnaces would result in production increases of at least 10 per cent, or a total of 1,800,000 tons of steel.

"If the war should last from three to five years, as many believe it will, air conditioning 50 existing furnaces would give the United States additional steel sufficient for 60,000 thirty-ton tanks or 900 destroyers," he said.

"The cost of 'dry blast' equipment for these furnaces would be from $6,500,000 to $8,000,000 and the equipment would call for 3000 tons of steel. Four to eight months would be required to provide the equipment. In order to obtain an equivalent increase in production it would be necessary to build five new blast furnaces, costing $15,000,000 to $20,000,000 and requiring 18 to 24 months to build, and requiring 45,000 tons of steel."

Mr. Dunne was scheduled to speak on this subject at the meeting of the American Society of Refrigeration Engineers in Skytop, Pa., June 8.

Railroad locomotives delivered by builders in April numbered 132, compared with 125 in March and 74 in April, 1941. Deliveries in four months this year totaled 446, against 264 in the corresponding period in 1941. Unfilled orders at the end of April were 1425 units, compared with 1332 at the end of March and 622 in April, 1941.

Urge Prompt Return of Empty Metal Containers

Manufacturers of products shipped in steel or alloy steel containers are conducting campaigns to expedite return of empty containers to be refilled and redistributed to consumers.

Some producers have devised special posters to stimulate interest, such as those above issued by Air Reduction Sales Co., New York. These are offered free of charge by the company for mounting in plants where oxyacetylene processes are used. Linde Air Products Co., New York, is conducting a similar campaign.

Containers are mainly cylinders for oxygen and other industrial gases, drums for oil, grease and chemicals. Many are fabricated from high alloy steel. Oxygen cylinders are seamless, drawn from alloy steel billets and heat treated. Each, complete with valve, costs about $29.50. Not only are the cylinder inventories expensive, but the materials to replace them are no longer available in most cases.

To conserve critical materials and aid in the manufacturers' effort to expedite returns, Price Administrator Leon Henderson has ruled that customer deposits on containers which the customer returns for re-use may be inaugurated, or increased, without violating the General Maximum Price Regulation, issued by OPA.

CUTS METAL FASTER... SAVES OXYGEN

SURVEY SHOWS:

14.2% to 45.2%
SAVING IN OXYGEN

21.1% to 28.8%
FASTER CUTTING

WITH
Airco "45"
HIGH-SPEED MACHINE
GAS CUTTING TIP

Improved performance with Airco "45" tips over standard machine gas cutting tips

Metal Thickness	Average % increase in cutting speed	Average % savings in oxygen consumption
½"	21.1	14.2
1"	22.2	24.0
2"	25.8	39.5
3"	28.8	45.2

Figures shown are averages obtained in survey recently completed in Philadelphia area.

Additional proof of the outstanding performance of the new Airco "45" High-Speed Machine Gas Cutting Tip was obtained in a survey of representative plants in the Philadelphia area. On steel thicknesses of ½" to 3" a direct comparison with previous results was obtained. The results of this survey are tabulated here. Note that in addition to increasing metal cutting speeds, Airco "45" Tips make possible considerable savings in oxygen . . . a most important consideration in our country's united war effort.

Get complete details by writing for Bulletin ADC-631.

Air Reduction

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AIRCO WILSON

IDLE CYLINDERS ARE PRODUCTION SLACKERS: *Keep 'em tolling for victory!*

Fewer Steel Orders But Larger Tonnage

Most users to go under PRP July 1. May ore movement promises WPB goal attainment. Specifications heavy against contracts

MARKET IN TABLOID ★

Demand

Heavy specifications filed.

Prices

Steady at ceilings.

Production

Unchanged at 99 per cent.

CURRENT orders for steel are being received in smaller number, though usually for larger tonnages and longer periods. This affords no relief to steelmakers, as books are crowded with sufficient business to keep them busy for many months.

Decline in requests may be attributed to cessation of manufacture of consumer goods under War Production Board orders and the fact that many consumers have found their priority ratings are too low to give them standing with mills.

While new orders have declined, mills are receiving specifications against A-1-a contracts in heavier volume, in many cases exceeding shipments. Allocations are becoming more frequent as WPB aid is sought to untangle conflicting needs under top ratings. Expectation grows that complete allocation of steel must be undertaken to distribute steel where most needed.

Sheet requirements for war are relatively light in comparison with heavier steel products and as a result semifinished steel for sheet mills is limited and some sheet departments are working only part time or not at all. Inasmuch as large capacity normally devoted to strip and sheets now is engaged in plate production, remaining capacity for sheets is comparatively limited.

New National Emergency steels, socalled lean alloys, now are being produced and made available through various distributors. Users are asked to try the new analyses in their regular production and report results. Results of their use are being charted (pp. 66-69) and are being made available to the industry as a guide to broader use.

Forthcoming revision of Priorities Regulation No. 3 will require more than 10,000 companies, including most of those handling large war contracts, to operate under Production Requirements Plan after July 1. It is announced that all but a few classes of companies needing more than $5000 worth of metal for third quarter must apply for priority assistance under PRP before July 1.

Steelmaking last week continued at 99 per cent for the third consecutive week as scrap supply was maintained and furnace repair did not cut into production. Eastern Pennsylvania rebounded 5 points to 96 per cent, recouping the loss from floods the previous week. Pittsburgh advanced 1½ points to 95½ per cent and Wheeling 3½ points to 81½ per cent. Chicago was unable to maintain its peak and dropped 2½ points to 104½ per cent. Cincinnati receded 3½ points to 91½ per cent, Detroit 5 points to 87 and New England 6 points to 89. Unchanged rates were maintained at St. Louis, 98; Cleveland, 94; Buffalo, 90½; Birmingham, 95; Youngstown, 94.

Pig iron distribution in June has been the heaviest for some time as more consumers obtain war work. In some cases melters who had large inventories when mandatory distribution started have been working from their stocks, without further deliveries, and now have reached the end of the surplus and are asking allocations to support their priority production. Pig iron output is being advanced steadily, many stacks making new records month by month. A new Defense Plant Corp. furnace in the South is increasing tonnage in that district and the New England stack has resumed after relining. With better scrap supply the pig iron situation has eased materially.

Flood of scrap is sufficient in nearly all steelmaking districts to support the high rate of production and also to provide reserves. In some cases dealers are receiving more than they can prepare with labor forces available. It is being allowed to accumulate for later preparation. No large reserves have yet been built but the situation is much more comfortable than for many months. Efforts to clear automobile wrecking yards are not relaxed and it is hoped to have all available scrap from this source on its way before winter. Under present conditions of plenty consumers are inspecting more closely and some rejections are made.

Attainment of War Production Board's goal in iron ore movement is indicated by the record tonnage moved in May, 12,677,356 gross tons, which was 1,596,157 tons or 14.4 per cent, over May, 1941. For the season to June 1 a total of 21,327,064 tons was shipped, 3,291,072 tons, 18.25 per cent, over the same period last year. Each of the three months since navigation opened has set a record.

Composite prices of steel and iron products are steady at ceiling levels. Finished steel holds at $56.73, semifinished steel at $36, steelmaking pig iron at $23.05 and steelmaking scrap at $19.17.

COMPOSITE MARKET AVERAGES

	June 6	May 30	May 23	One Month Ago May, 1942	Three Months Ago Mar., 1942	One Year Ago June, 1941	Five Years Ago June, 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.18
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.84
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	17.05

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	June 6, 1942	May 1942	Mar. 1942	June 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.48	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.22	2.2175	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	June 6, 1942	May 1942	Mar. 1942	June 1941
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.365	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.265	26.24	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.34	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	125.39	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	17.75
Heavy melting steel, Chicago	18.75	18.85	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	21.50

Coke

Connellsville, furnace, ovens	$6.00	$6.00	$6.00	$6.25
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942 The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh base, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c Pac. ports, dock 2.50c; all rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.)
Joslyn Mfg. Co. may quote 2.35c, Chicago base.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c Detroit, del. 2.82c.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	5100 Spr. flats	0.15
2100	0.75	5100 80-1.10 Cr	0.15
2300	1.70	6100 Bars	1.20
2500	2.55	6100 Spr. flats	0.85
3100	0.70	Carb., Van.	0.85
3200	1.35	9200 Spr. flats	0.15
3300	3.80	9200 Spr. rounds, squares	0.40
3400	3.20	T 1300, Mn, mean 1.51-2.00	0.10
4100 .15-25 Mo. 46.00 .20-.30 Mo. 1.50-2.00; Ni.	0.55 1.20	Do., carbon under 0.20 max.	0.35

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports, 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage,

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote ship plates 2.25c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Wire Products to the Trade:	
Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	67
Do., 11 gage and heavier	70
Barbed wire, 80-rod spool, col.	70
Twisted barbless wire, col.	70
Single loop bale ties, col.	59
Fence posts, carloads, col.	69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

	Steel Blk.	Steel Galv.		Iron Blk.	Iron Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

	Steel Blk.	Steel Galv.		Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	..	67.00c
18.00	4	2	1	77.00c
18.00	4	3	1	87.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	32.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	‡‡18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. ‡‡Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin of shipment.
Dislocated tonnage: Producers shipping material outside their usual marketing areas because of the war emergency may charge the basing point price nearest place of production plus actual cost of transportation to destination.
Seconds or off-grade iron or steel products cannot be sold at delivered prices exceeding those applying to material of prime quality.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941. Domestic or export extras may be used in case of Lease-Lend tonnage.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ¾ x 6-in. and shorter	63½ off
Do., ⅞ to 1 x 6-in. and shorter	61 off
1¼ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
⅛-1-inch	59	60
1⅛-1⅛-inch	57	58
1¼ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.00

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	.....	25.00	24.50
St. Paul, del.	26.76	.....	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50
6.51-7.00	$30.50
7.01-7.50	31.50
7.51-8.00	32.50
8.01-8.50	33.50
8.51-9.00	34.50
9.01- 9.50	$35.50
9.51-10.00	36.50
10.01-10.50	37.50
10.51-11.00	38.50
11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.54

Southern

Semi-cold blast, high phos, f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942.

Export Prices: In case of exports only, the governing basing point nearest point of production may be used, plus differentials and export transportation charges.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, Ill. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$23.00-25.00
Do., barge	23.00-25.00
No. 2 lump	23.00-25.00

(OPA May 11 established maximum at Jan. 2, 1942, level.)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.50c; packed 5.75c; ton lots 6.00c; less-ton lots 6.25c; less 200-lb. lots 6.50c. Spot prices ¼-cent higher.

Electrolytic manganese: 99.9% plus, less carlots, per lb. 42.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Carloads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $128; ton lots $140.50. Spot $5 per ton higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producer's plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V.O. contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Soft Bars	Hot-rolled Bands	Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars Carbon	Cold Drawn Bars S.A.E. 2300	Cold Drawn Bars S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.04	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Chattanooga*	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.20	4.25	5.45	4.75	4.45	6.50	4.65	7.60	5.70	....	5.75	....	....
Los Angeles	4.50	4.95	6.80	4.50	4.50	6.75	4.65	6.50	5.85	....	6.10	10.55	9.55
San Francisco	3.95	4.50	6.25	4.65	4.35	6.35	4.55	6.40	6.10	....	6.80	10.80	9.80

*Not named in OPA price order.

	S.A.E. Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	8.80
San Francisco	5.45	9.80	8.80	8.65	9.05

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	L s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.95c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1 10 9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

		L s d
Foundry No. 3 Pig Iron, Silicon 2.50-3.00	$25.79	6 8 0 (a)
Basic pig iron	24.28	6 0 6 (a)
Furnace coke, f.o.t. ovens	7.56	1 17 6
Billets, basic soft, 100-ton lots and over	49.37	12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17 12 0††
Shapes	2.77c	15 8 0††
Ship plates	2.91c	16 3 0††
Boiler plates	3.06c	17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23 15 0
Bands and strips, hot-rolled	3.30c	18 7 0

(a) del. Middlesbrough. 5s rebate to approved customers. ††Rebate 15s on certain conditions.

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 500-999, Los Angeles, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.30

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees

Indian and African, 2.8:1 lump, 48%	$39.00
South African (excluding war risk)	
No ratio lump, 44%	28.00
Do. 45%	29.00
Do. 48%	34.00
Do. concentrates, 48%	33.00
Do. 50%	34.00
Brazilian (nominal)	
2.5:1 lump, 44%	31.00
2.8:1 lump, 44%	32.50
3:1 lump, 48%	41.00
No ratio lump, 48%	35.00-35.50
Do. concentrate, 48%	33.00-33.50

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	....
S. African, 48%	65.00
Indian, 50%	68.00-70.00
Brazilian, 48%	....
Chilean, 48%	68.00-69.00
Cuban, 51%, duty free	83.00-85.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

				Low Phos. Grades		ELECTRIC FURNACE AND FOUNDRY GRADES								
						Heavy Structural, Plate			Cut Auto Scrap					
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	3 ft. and less	2 ft. and less	1 ft. and less	3 ft. and less	2 ft. and less	1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Oreg.	.....	.....	.....	.....	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	21.00	22.00	23.50	24.00	24.25	24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. **Blast Furnace Grades** refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings. Add $5 per ton for chemical borings containing not over 0.5 per cent oil content.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, provided most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington and Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip

Sheet & Strip Prices, Page 122

Heavy pressure for plate results in further reduction in sheet output. A midwestern steelmaker has not operated its sheet mills for about three weeks. This results from lack of sheet bars, tonnage of A-1-a sheet orders being too small to command sufficient semifinished steel in the fact of large high priority requirements for heavy products. It is understood some sheetmakers have asked allocation of semifinished steel, but without result.

Narrow cold-finished strip deliveries on ratings below A-1-d are indefinite, most new bookings, which about equal shipments, being confined to A-1-a ratings for fewer buyers placing larger individual tonnages. Operations are keyed to hot strip replacements and limited in some cases to annealing capacity for a high ratio of high carbon and alloy orders. Hot strip mills on the whole are not at capacity due to lack of steel, which is being diverted to other products. Some large offerings of cold strip including stainless, are being made by consumers who find stocks frozen by limitation and restriction orders on goods normally fabricated.

Not only strip, but large lists of other products are appearing for sale, including cold-rolled and galvanized sheets, galvanized wire and other wire products, while one offering includes more than 1000 tons of cold-rolled bars. This material was processed for specific uses as a rule and unless applicable to high-rated war contract work may be slowly liquidated. This steel being offered for resale is not apparently affecting mill demand. Call for strip from platers has dropped to a low point except for war needs, including messware and cutlery, much of the former being silver-plated.

Plates

Plate Prices, Page 123

Slightly broader distribution of plates is confined to narrow widths from wide strip mills, June deliveries extending down to re-extended A-1-c orders, 42-inch and under. Wider sheared material is allocated direct or geared to scattered A-1-a ratings. Better balance in shipyard inventories is gradually being attained with a view to stabilizing at about 45 days supply and in several cases heavier shipbuilding reserves are being pared down. Boiler and other fabricating shops consuming plates are getting deliveries against near-top ratings only, mostly to cover subcontracts with like priorities. Small tank builders are engaged substantially on war goods, which supplement a limited volume of highly rated tank demand.

Central Iron & Steel Co., Harrisburg, Pa., which had been allowed to quote 2.35c, basing points, for steel plates, instead of 2.10c allowed other producers, which privilege was withdrawn by OPA, effective May 30, has been allowed to quote 2.20c, an advantage of $2 per ton over the base for other producers. OPA states withdrawal of the entire $5 allowance was an error.

Bars

Bar Prices, Page 122

Most demand for steel bars is centered in old contracts, mainly A-1-a, with releases heavy for all finishes, including carbon and cold-finished. Direct mill shipments predominate and distributor stocks are broken and depleted on numerous sizes. Deliveries against top ratings for hot-rolled carbon bars are maintained at about ten weeks, or slightly less in some instances.

Allocation of chromium-nickel alloys have tightened, chromium being even scarcer than nickel and only for a few uses are these alloys available, including heat treating equipment, steel mill rolls, bearing metals and other needs which must be designated by the iron and steel branch of WPB, including some tool steels and forging equipment.

Wire

Wire Prices, Page 123

While products limitations currently going into effect have caused some cancellations of wire orders the total is not as large as expected. Manufacturers' wire for war uses accounts for most current business.

HAYS
GAS-AIR
RATIO CONTROLLER

Automatic
COMBUSTION
CONTROL
for SOAKING PITS
SLAB HEATING, RE-HEATING FURNACES, ETC.

PRESSURE CONTROL—control of heat input or complete combustion control are offered by HAYS to help produce MORE steel, BETTER steel at lower cost. Hays engineers are at your disposal in securing quick action in applying partial or complete control as your need demands. Get in touch with the nearest Hays representative or write the factory direct.

For Oil Fired Furnaces—Publication 42-527
For Gas Fired Furnaces—Publication 42-526
For Pressure Control—Publication 42-530

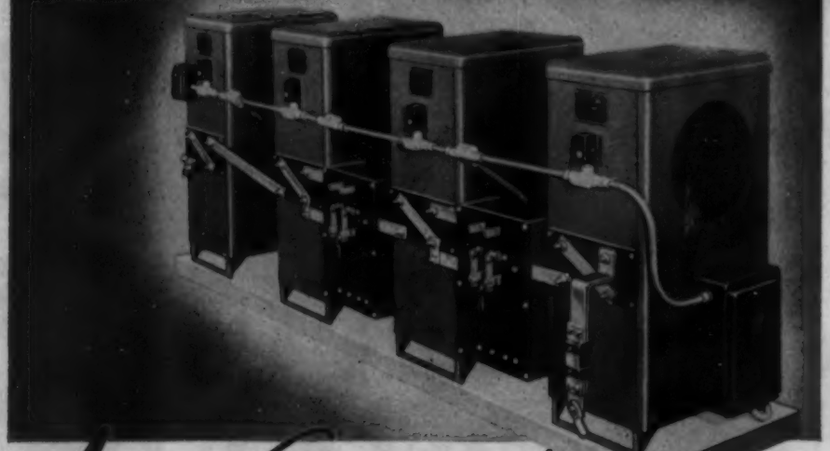
The HAYS CORPORATION
COMBUSTION INSTRUMENTS AND CONTROL
MICHIGAN CITY, INDIANA, U.S.A.

Some merchant wire items are active, mainly on special directives, largely for agricultural purposes. Barbed wire demand is high but fencing orders are far below capacity. Non-integrated producers still encounter difficulty in obtaining sufficient wire rods and are seeking a change in allocation of semifinished.

Orders and shipments of wire products are closely balanced with finishing operations, which are limited by rod supplies, notably in alloys. Plain carbon wire is being substituted by numerous consumers normally using alloy wire. Trend toward top A-1 ratings continues, with the ratio increasing. Wire rope mills have much new tonnage and are seeking heavier deliveries of strand, a demand difficult to fill. Galvanizing departments are clogged with A-1-a orders, with direct allocations governing sequence of processing considered likely.

Amendment No. 5 to revised price schedule No. 6, effective May 30 provides for a basic discount of not less than 40 cents per 100 pounds on bale tie low-carbon basic or bessemer manufacturers' wire. However, the amendment allows a less discount to a customer where such lesser discount was actually and customarily granted as of April 16, 1941 by a producer who customarily sold bale tie wire to that customer. Producers who receive orders for the first time from a customer are required to observe the minimum discount of 40 cents.

RECTO-PLATERS



for Anodizing

SULPHURIC OR CHROMIC ACID PROCESSES

If your war materiel contract calls for anodizing by either the chromic or sulphuric acid method, be sure to investigate the advantages of the Udylite-Mallory Rectoplater.

RECTOPLATERS ARE QUICKLY AVAILABLE. We can make prompt shipment.

A WIDE RANGE OF AMPERE-VOLT COMBINATIONS CAN BE SECURED. By grouping single Rectoplater units in series, practically any anodizing requirement can be filled.

RECTOPLATERS HAVE HIGH CONVERTIBILITY VALUE. When the present need subsides, the Rectoplater anodizing set-up can be broken into individual units for such purposes as barrel and still tank plating, electrocleaning, etc.

We are equipped to design and supply complete anodizing installations. Udylite's experienced engineers will be glad to help you with your metal finishing problems.

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Pipe

Pipe Prices, Page 123

Most distributors of merchant pipe see an increasingly lean period ahead. While the A-3 rating up to this time has provided them with at least some bessemer pipe, it apparently will not be able to do so long. Some producers of bessemer can no longer supply tonnage in the lower classes of the A-1 group and the situation is becoming constantly tighter.

On merchant pipe made of open-hearth steel, ratings of A-1-c or higher are necessary in most cases, thus being even more difficult to obtain through the PD 83-g forms than bessemer. Most plumbing supply houses and distributors have fair stocks on hand, but it is believed by early fall a number will have about exhausted them.

Rails, Cars

Track Material Prices, Page 123

Little car demand is appearing. Undoubtedly lists are under contemplation, but railroads are not disposed to send out inquiries until they have assurance from the War Production Board that steel and other materials will be available. Among the few inquiries noted recently is one from the navy, calling for bids June 23 on 68 flat cars, 10 box cars and two gondolas, all of 40 tons capacity and 36-inch gage.

Rolling schedules of rail mills are heavy, part of the burden being rails for Russia on lease-lend, which are given preference. Shell steel demand is also heavy and has increased rapidly in the past few weeks. Indications are that shell requirements will be large for several months.

Structural Shapes

Structural Shape Prices, Page 123

Backlogs of fabricated and plain structural steel have been whittled down close to 100,000 tons by hold-up orders involving contracts for floating dry docks, locks, power plants and miscellaneous war plants and extensions. In addition work being estimated, aggregating 75,000 tons, has been dropped temporarily at least, including steel plant expansions in the east. In a few cases where contracts have been suspended, part of the steel, but relatively little of the tonnage has been rolled, but only a small part delivered to the fabricating shops or job site. Plain structural material is now tighter than plates with some integrated mills. While structural shops are losing tonnage by suspensions, backlogs remain heavy with operations at capacity, current schedules likely to hold through the third quarter, for while much tonnage is being lopped off, incoming volume is still substantial for indispensable war construction and export.

Reports that shapes may soon be placed on a full allocation basis are

not favorably received by some fabricators. They point out that deliveries on A-1-a could be made worse under such a system as now prevails in plates. They say they can get deliveries on such ratings within eight to ten weeks but that under allocation these deliveries might be extended almost a month.

Due to change in government policy with respect to further steel expansion the proposed $21,000,000 for Alan Wood Steel Co. has been dropped. Under consideration had been a 130-inch plate mill, large blast furnace, coke ovens and an increase in open-hearth capacity.

Reinforcing Bars

Reinforcing Bar Prices, Page 123

While demand for reinforcing bars continues heavy some easing is expected to follow effort to conserve steel in construction. In numerous projects the quantity of bars has been scaled down drastically within the past few days. High-strength concrete without reinforcement and wood construction are affording considerable saving. In some cases original plans requiring 200 tons of bars have been changed to use only 15 tons.

At the same time heavy demand is met for special engineering projects, all highly rated. At the moment requirements are pending, about 27,000 tons, for reinforced concrete barges, for 18 of which contracts have been let to a Brooklyn shipbuilder, for construction at a southern yard. Other barges are being built at other points, taking 22,500 tons. The barges are 360 feet long with capacity of 5000 to 8000 gross tons, depending on nature of cargo.

Construction of large tanks for fuel oil storage is restricted, the few important projects under construction being of reinforced concrete, including 12 units in Maine. Three large plants for aircraft engine parts will be built in New England, redesigned for concrete.

Releases against contracts for Atlantic bases have eased. Depending on rolling schedules, some stock replacement of smaller sizes is possible on extended A-1-e ratings, but this is uncertain. Distributors are accepting only orders covered by top ratings, to assure replacements.

Pig Iron

Pig Iron Prices, Page 124

That the last large inventory of iron in New England has been depleted is indicated by need for allocation in volume in July for the first time. This consumer, in the textile equipment field, has taken in practically no tonnage since mandatory distribution started, indicating the size of the original inventory. About half its capacity is now on war contracts. The situation in this area is better since the district blast furnace resumed production.

In the Cincinnati district pig iron deliveries are estimated to be the heaviest this year, as foundries have increased their war work and thus obtained good ground for enlarged requisitions. American Rolling Mill Co. has broken pig iron production at the Hamilton furnace each of the last three months. None of this iron is available for the merchant market.

Southern pig iron production is at capacity, enlarged by output of the Defense Plant Corp's new furnace blown in ten days ago.

Scrap

Scrap Prices, Page 126

Scrap supply is sufficient for current high steel production and some accumulation of reserves is possible. At the moment high-quality No. 1 heavy melting steel is most sought after. Open-hearth operators assert a need for this to bring up the quality of their scrap charge. Increasing tonnage is going to acid furnaces, much of it on allocations, relieving a difficult situation existing for some time. Electric furnace operators also are said to be getting some relief, but not enough. Cast scrap now is in an easy position, largely due to supply of motor blocks from wrecked automobiles. Curtailment of gray iron foundry operation also has lessened demand.

For trans-shipment by rail to

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Ahlberg Engineering Help
DESPITE TODAY'S ABNORMAL CONDITIONS, AHLBERG ENGINEERING SERVICE is being maintained as usual. Bearing specialists are available in all 23 branches to help you with your immediate bearing problems.
In addition a definite part of Ahlberg Engineering Service is the assistance to bearing users in preparing for alteration of designs and the development of new products with a view to future conditions when new bearings are once again available for normal uses.
It is Ahlberg's desire to make all its facilities available for the needs of peace as well as for the immediate problems of war.
FACTORY BRANCH STOCKS AT
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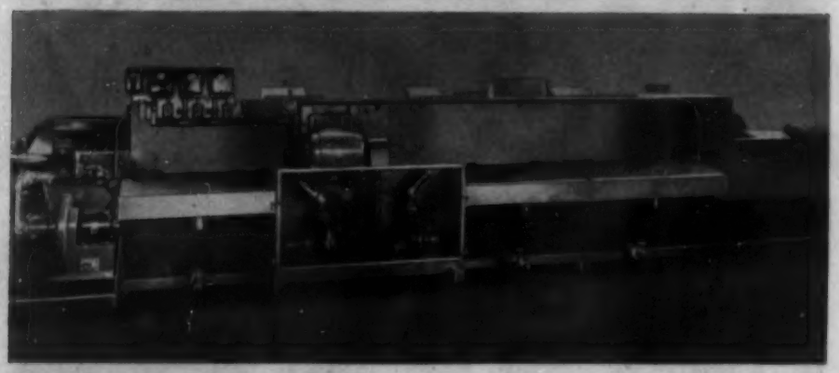
eastern Pennsylvania some steel-making grades are moving from New England to Jersey City docks by barge at $15.05, port, against $14.06, f.o.b., paid inland. Salvage programs in New England, notably automobile wrecking and street car rail removals, are gaining momentum and supplies of foundry and steel grades are ample, more consumers building reserves. Rails generally are allocated directly to producers of steel or steel castings, a substantial tonnage to Eddystone, Pa., being included.

Office of Defense Transportation has postponed from June 1 to July 1 the effective date of truck order No. 5 prohibiting operation of trucks for deliveries unless a 75 per cent return load is carried. The postponement is to allow time for affected industries to work out plans for conforming. No relaxation in the order is contemplated.

Cincinnati foundries have been in receipt of increased tonnages of rails reclaimed from abandoned street railway lines, but this supply has been nearly exhausted and further search is being made. Some foundries have been able to accumulate small reserve of cast scrap.

With recent restrictions on sale and consumption of scrap containing nickel over 0.5 per cent, some peculiar situations have arisen. High nickel grades move well, but those containing about 1 per cent sometimes fail to find takers. One interest has been unable to dispose of a car of this lower grade scrap and because of restrictions is unable to sell it as open-hearth material. As yet a ruling on disposition has not been forthcoming.



PROVED *on the production line*

This Ransohoff Metal Cleaning Machine was developed especially for the efficient cleaning of 75, 90, 105 and 155 mm. projectiles. Its practical application on the production line, washing, rinsing, and rust-proofing, has proved its ability to more than meet expectations. Many valuable man hours are saved, production increased and cleaned products readily take a better final finish.

Don't let old fashioned methods of cleaning metal parts handicap your operations. With the demand for more and more production in faster time, it is essential that cleaning equipment be efficient.

That's why Ransohoff Metal Cleaning Equipment is in great demand by manufacturers, engaged in the production of war material. They well know the many advantages of Ransohoff Equipment built to your exact requirements. Speed is most essential to you and we can supply definite information promptly.

Write or wire Dept. "S" for catalog or further information.

N. RANSOHOFF, Inc.

METAL CLEANING SPECIALISTS

TOWNSHIP AND BIG FOUR R. R. CINCINNATI, OHIO

Iron Ore

Iron Ore Prices, Page 125

Iron ore movement on the Great Lakes in May set a new record at 12,677,356 gross tons, an increase of 1,596,157 tons over May, 1941, and 1,181,053 tons greater than the previous high established in August, 1941. The May tonnage was a gain of 14 per cent over May, last year and almost 10 per cent over the August record. The figures are by the Lake Superior Iron Ore Association, Cleveland.

Total movement for the season to June 1, was 21,327,064 tons, an increase of 3,291,072 tons over the same period in 1941, or 18.25 per cent. In the three months during which ore has been moved three records have been set. March, with 792,558 tons, marked the earliest and heaviest movement for that month and April shipment of 7,857,106 tons was the largest for that month.

Canadian ships, operating between United States ports under congressional permission, number about 20 bottoms. Office of Defense Transportation has limited movement of grain and coal by ship on the Great Lakes, in favor of ore and this is aiding the latter. Predictions are made that records of 13,000,000 tons may be made during the summer when navigation conditions normally are best of the year.

Details of the May ore movement are as follows:

	May, 1941	May, 1942
Escanaba	982,458	629,232
Marquette	762,432	855,966
Ashland	916,196	1,094,596
Superior	4,502,281	3,941,544
Duluth	3,168,622	2,690,072
Two Harbors	2,290,875	1,796,029
Total U. S.	12,622,872	11,007,439
Michipicoten	54,484	73,760
Grand Total	12,677,356	11,081,199

Increase from year ago, 1,596,157.

Cumulative statistics to June 1 are as follows:

	To June 1, 1942	To June 1, 1941
Escanaba	1,753,749	1,120,757
Marquette	1,463,006	1,624,414
Ashland	1,734,725	1,853,022
Superior	7,422,430	6,022,885
Duluth	5,030,188	4,365,394
Two Harbors	3,800,558*	2,939,881
Total U. S.	21,204,656*	17,926,353
Michipicoten	122,408**	109,639
Grand Total	21,327,064	18,035,992

Increase from year ago, 3,291,072.

*Includes 44 tons additional in March.
**Includes 67,924 tons shipped in April.

Steel in Europe

Foreign Steel Prices, Page 125

London—(*By Cable*)—War requirements for steel and iron in Great Britain continue to increase and full employment is assured for

many months. Alloy and special steels are in particularly heavy demand. Pressure is insistent on plate mills. Scrap supply is adequate and pig iron production is well maintained.

Pacific Coast

Seattle—Easing of the government's order freezing the lumber output of this area appears to insure materials for housing projects in defense centers which still means that the entire production of the industry is being absorbed in government channels. Capacity is unequal to the demand and imports of lumber and other forest products from British Columbia continue on a large scale. Loggers and lumber plants are getting higher priorities to enable them to make necessary replacements although the shortage of automotive equipment is still a problem. Two large housing contracts have been placed, 1000 units at Portland to Wesco Construction Co., Los Angeles, at $3,220,000 and 600 units near Milwaukie, Oreg., to Viesko & Hannaman, Salem, Oreg., at $1,756,000.

Unstated tonnages of shapes are involved in two contracts by the navy department for yard equipment. Shepard-Niles Crane & Hoist Co., Montour Falls, N. Y., low at $167,281, will furnish 14 wall cranes and four bridge cranes at the Puget Sound yard and one bridge crane at the Keyport station. Harnischfeger Corp., Milwaukee, has a $136,050 contract for furnishing six bridge cranes for the Puget Sound yard.

Washington Stove Works, Everett, Wash., has a $150,000 metal contract from the Maritime Commission and will alter plant for this job which will require a year's operation. Puget Sound Bridge & Dredging Co., awarded a naval contract for wooden drydock on the Columbia river, will build four smaller units instead of one large dock as originally planned.

Tacoma opened bids June 3, for unstated quantity of plates involved in penstocks and outlet pipe at Alder and LaGrande dams, Nisqually power project.

San Francisco — Maritime Commission has awarded 65 C-2 type cargo vessels to Moore Dry Dock Co., Oakland, Calif., requiring 128,700 tons of plates and 85,800 tons of shapes.

Interest is displayed over announcement that Kaiser Co. Inc., division of Iron & Steel, Oakland, will build a steel plant at Fortuna, Calif. While definite information has not been released it is understood that at least one blast furnace and several open hearths will be constructed and that a three-high plate mill for rolling 110-inch plates will be installed. It is possible a structural mill will be included. Reports state that the Kaiser company has submitted a bid for a blast furnace in the East, to be dismantled and re-erected at Fortuna. An award for 2300 tons of steel for a blast furnace has been placed with various interests. While demand for plates continues heavy no large awards were made last week.

Concrete Ship Constructors, Los Angeles, has been awarded 17 reinforced concrete barges for the government, requiring 27,000 tons of bars. Bids have been taken on half the tonnage, the remainder to be purchased later.

Bids open June 11 for raising Ross dam on the Skagit hydroelectric project about 200 feet. Included in required materials is 550 tons of reinforcing bars.

Government buying of cast iron pipe continues to take most foundry output. Little tonnage has gone to private interests this year.

Canada

Toronto, Ont.—As a result of more drastic government action during the past week, there has been general tightening of priorities control. Consumers who are classed as non-essential have been almost entirely dropped and local steel interests state that only top ratings are receiving delivery. Materials of United States origin are strictly controlled under the Production Requirements Plan, which means that equpiment, tools and other materials brought into the country must conform to the new regulations and are allotted only to Canadian plants

KENNAMETAL SPEEDS
Victory PRODUCTION
KENNAMETAL
THE All American CARBIDE
STYLE 2
STYLE 1
STYLE 6
STYLE 3
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STYLE 15
On old machines or new . . . on steels of hardnesses up to 500 Brinell, KENNAMETAL tools permit machining speeds 2 to 6 times greater than are possible with high speed steel tools. In addition, KENNAMETAL removes 3 to 10 times more metal between regrinds, and often combines roughing and finishing in one cut.
These KENNAMETAL advantages add up to MORE guns, planes, tanks and ships. That's why it's important NOW to put KENNAMETAL in your tool rest.
McKENNA METALS Co.
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that can prove need and adhere to priority schedules. In filling consumers or warehouse orders the buyer must state the ultimate use of materials and where it is found that supplies are going to non-essential users the warehouse operator, on his next order, is allowed that much less.

Special consideration is being given to plate and sheet production for urgent war work and with these departments running full semi-finished steel is diverted from other rolling operations. Demand for plates and sheets continues at record levels.

Merchant pig iron sales were close to 10,000 tons for the week, which is close to the maximum under present production schedules for foundry and malleable iron. Inquiries continue well in excess of supply, but only orders approved by the steel controller are being filled and all are directly associated with the war effort.

Movement of iron and steel scrap from rural districts, auto wreckers and producing pants is breaking all previous records with the result that offerings exceed actual consumers' needs. This condition is enabling steel mills and electric furnaces to replenish yard stocks and accumulations are being built. Offerings of steel scrap are particularly heavy. Larger quantities of cast scrap also are appearing and dealers have been able to meet most demands in the past two or three weeks, but foundries are having difficulty in gaining any large stock accumulations.

NE Lean Alloy Extras Are Revised Downward

Revised alloy content extra list on bars, bar-strip, billets, blooms and slabs in the NE (National Emergency) alloys has been announced by several producers. Some reduction on several alloys has been made from previously announced lists.

The new extras are as follows:

(Extras per 100 lbs. for alloy content)

Designation	Basic Open-Hearth Bars, Bar Strip	Basic Open-Hearth Billets, Blooms, Slabs	Electric Furnace Bars, Bar Strip	Electric Furnace Billets, Blooms, Slabs
A 4027...	.55c	$11.00	.....	.....
A 4037...	.45c	9.00	.....	.....
A 4063...	.45c	9.00	.....	.....
A 4068...	.45c	9.00	.....	.....
NE 8024..	.45c	9.00	.95c	$19.00
NE 8124..	.85c	17.00	1.35c	27.00
NE 8233..	.65c	13.00	1.15c	23.00
NE 8245..	.65c	13.00	1.15c	23.00
NE 8339..	.75c	15.00	1.25c	25.00
NE 8442..	.90c	18.00	1.40c	28.00
NE 8447..	.90c	18.00	1.40c	28.00
NE 8547..	1.25c	25.00	1.75c	35.00
NE 8620..	.75c	15.00	1.25c	25.00
NE 8630..	.75c	15.00	1.25c	25.00
NE 8724..	.80c	16.00	1.30c	26.00
NE 8739..	.80c	16.00	1.30c	26.00
NE 8744..	.80c	16.00	1.30c	26.00
NE 8749..	.80c	16.00	1.30c	26.00
NE 8817..	.90c	18.00	1.40c	28.00
NE 8949..	1.20c	24.00	1.70c	34.00

Warehouse Stocks New Emergency Alloy Steels

Joseph T. Ryerson & Son Inc. has announced addition of the new NE (National Emergency) alloy steels to its warehouse stocks. These are new "lean" alloy steels established by the metallurgical staff of the War Production Board to help conserve nickel, chromium, vanadium, etc., for the duration. To make them available quickly the company has planned a representative stock of hot-rolled rounds from ½-inch to 7 inches in diameter in six analyses. Manufacturers may obtain small lots for treating and testing in specific applications, preparatory of adopting their use.

Exact distribution is not yet decided but initial stocks will consist of six analyses. In the carburizing alloys NE 4023 and NE 8620 will replace AISI and SAE 2300, 2500, 3100, 4100, 4600, 5100 and 6100; in medium hardening grades NE 4042 and NE 8744 will replace 2330-35, 3130-35, 4130-35, 5130-35 and 6130-35; in high hardening grades NE 4047 and NE 8749 will replace 2300, 3100, 3200, 4100, 4600, 6100.

It is believed these alloys, properly selected and heat treated, will replace satisfactorily the higher alloy content steels formerly used, except in very special applications.

UNINTERRUPTED war-time production demands the positive, unfailing operation of Lever-Seald Homestead Valves. Thanks to their powerful lever and screw principle, and the exclusive "controlled lift" feature, Lever-Seald Valves cannot "stick" or "seize," even under the toughest service conditions. Use them on high pressure or high temperature hydraulic-stop service, and you get quick, quarter-turn opening or closing, and a positive seal *without lubrication.* Straight line flow for minimum pressure drop, and protected seating surfaces for long life, are added values which assure the user of continuous trouble-free service for "the duration." Specify Homestead Lever-Seald Valves on your next valve job.

Send for Valve Reference Book No. 38 and for special low prices on your quantity valve needs.

HOMESTEAD VALVE MFG. CO.

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MAKERS OF PEAK PERFORMANCE VALVES FOR 50 Years 1892 1942

Nonferrous Metal Prices

June	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-5	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets	
Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, 100 lb. base	13.15
Tubes	
High yellow brass	22.23
Seamless copper	21.37
Rods	
High yellow brass	15.01
Copper, hot rolled	17.37
Anodes	
Copper, untrimmed	18.12
Wire	
Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper	
No. 1 heavy	9.25-10.00
Light	7.25- 8.00
Brass	
No. 1 composition	8.75- 9.50
Heavy yellow	6.25- 6.75
Auto radiators	7.00- 7.75
Red Brass, borings & turnings	8.25- 9.00
Zinc	
Old	5.25- 5.75
New clippings	6.75- 7.25
Aluminum	
Clippings	10.00-11.00
Cast	9.00- 9.50
Pistons	9.00-10.50
Sheet	9.00- 9.25
Lead	
Heavy	5.65- 5.85
Mixed babbitt	4.50- 6.00
Electrotype shells	5.75- 6.25
Stereotype, Linotype	6.25- 6.50
Tin and Alloys	
Block tin pipe	44.00-46.00
No. 1 pewter	32.00-34.00
Solder joints	7.60- 8.10
SECONDARY METALS	
Brass ingot, 85-5-5-5, l.c.l.	13.25
Standard No. 12 aluminum	14.50

Nonferrous Metals

New York—W. L. Batt, chairman, Requirements Committee, WPB, warned that war demands have created shortages of raw materials that will become more serious as the war progresses. He summarized the situation in metal as follows:

Copper — 1942 domestic output plus imports will total 1,800,000 tons while another 300,000 tons will be derived from scrap. Despite this large total only a necessary minimum amount will be available for essential nonmilitary needs.

Lead—Supply continues at 110,000 tons per month compared with consumption restricted to about 75,000 tons, the remainder being stockpiled or re-exported.

Zinc — War demand continues strong for high grades, which probably will have considerable bearing on post-war markets. Some prime western metal is being redistilled into high grade.

Tin—With the Far Eastern source cut off, the United States has turned to Bolivia for ore which now is being smelted along with ore in a stockpile in the newly-completed government smelter in Texas.

Aluminum—Ingot capacity is being raised to 1,250,000 tons. Output this year should total about 1,083,000 tons, excluding that from scrap.

Equipment

Boston—Deliveries on some lines of machine tools are now ahead of orders. Production continues to mount monthly. While deliveries are being revised, based on new preference lists, resulting in some confusion, production is maintained and new orders, which were heavier in May than the previous month with most shops, are more definite as to details and specifications. Mass of incomplete orders taken before the April 1 priority deadline is gradually being cleared up. Some tentative contracts are dropped, others revised as to specifications, armament program needs and deliveries.

Subcontracting is steadily broadening, but is retarded somewhat by

Mexaloy refractory mixtures possess dual economical factors when employed in open-hearth and ladle use. Aside from increasing lining life, skulls come away quickly and cleanly—thus reducing labor and maintenance costs . . . Ladle bottoms packed with this super-refractory mixture give twice their normal life because slags and metal do not stick to a Mexaloy surface . . . Mexaloy is actually less expensive than ordinary loam coverings. Its inert character makes it usable in both acid and basic practice.

THE UNITED STATES GRAPHITE CO.
SAGINAW MICH.

MEXALOY

limited available machine tool operators. One large shop building grinders, normally letting out castings only, is subcontracting 175,000 hours of work per month. Outstanding in new buying are machine contracts for three aircraft engine plants being built in New England.

New York—Heading the preference list for machine tool deliveries is the aircraft industry, builders of heavier engines and bombers at the top. Suppliers of parts and equipment for these plants have corresponding ratings for deliveries; bearing plants are in this group, placing additional machine tool orders. Heaviest demand for new tools centers largely in automatic screw machines and turret lathes. Horizontal boring and drilling equipment are most extended as to deliveries, with planers probably next.

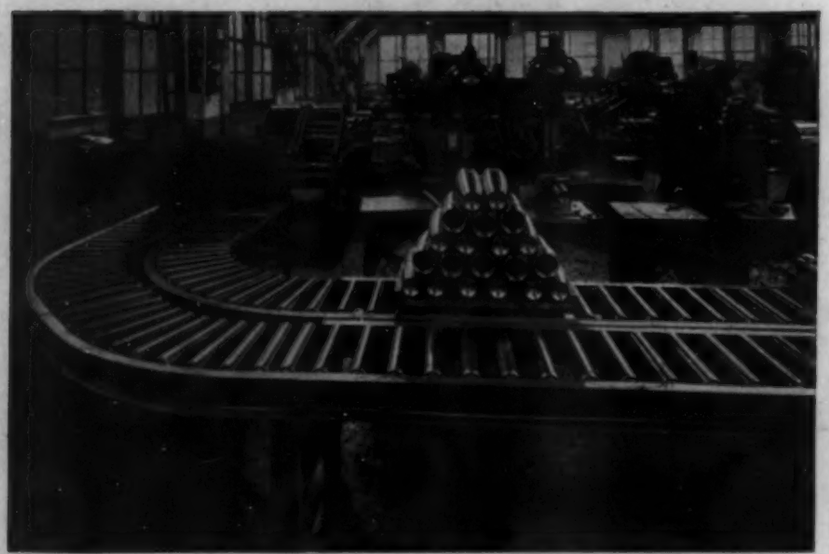
Dealers and builders continue to clarify the mass of confused specifications booked at the close of first quarter. Most shops are unwilling to estimate fixed deliveries until this confusion is cleared up, which for some will not be before July. Output continues to rise to record peaks each month. For small cutting tools higher ratios of molybdenum alloys are being specified, but for larger units difficulty is met in substituting for the usual tungsten steels. Critical alloys are also being eliminated where possible in jigs and fixtures. There is an improvement in some deliveries of cutting tools and more on chucks.

SERVING THE SINEWS OF WAR!

● THROUGHOUT AMERICAN INDUSTRY, in hundreds of plants, Mathews is at work. Conveyers that formerly transported tons of parts and supplies for peace-time products are now carrying the sinews of war in a constant stream of sustained, orderly production. If your production requires a faster tempo, it is quite possible that we, here at Mathews, can be of assistance. A word from you will bring complete information and engineering service.

DOUBLED CAPACITY FOR WAR PRODUCTION

Stepping up our productive capacity month after month has barely enabled us to keep pace with mounting war orders. As long as this condition exists, it becomes increasingly difficult to meet civilian requirements. Our one big job is the handling of war material. That job must come first.



MATHEWS CONVEYER COMPANY ELLWOOD CITY, PENNA.

Field Engineers and Sales Offices located in 30 Industrial Centers.

End-Use Classification Symbols Adopted by WPB

(*Concluded from Page 37*)

ing) Smelting and Processing of.
8.20 All Chemicals, Production and Processing of.
8.90 All other Raw Materials, Production and Processing of.

Class 9.00—Power, Light, and Heat.
9.10 Electricity.
9.20 Petroleum.
9.30 Coal and Coke.
9.40 Gas.

Class 10.00—Transportation.
10.10 Railroad including Urban and Interurban.
10.20 Automotive.
10.30 Roads, Streets, etc., Construction and Maintenance of.
10.40 Water Transportation, including construction of privately owned shipyards.
10.50 Air Transportation.
10.90 All Other Transportation.

Class 11.00—Communication.
11.10 Telephone.
11.20 Radio.
11.30 Telegraph.
11.90 All Other Communication.

Class 12.00—Public Health and Safety.
12.10 Sanitary & Health Systems & Facilities.
12.20 Health Equipment and Supplies including Personal Care.
12.30 Public Safety Equipment and Supplies.

Class 13.00—Agricultural Equipment and Supplies.

Class 14.00—Industrial Food Processing.

Class 15.00—Wearing Apparel.

Class 16.00—Equipment and Supplies for Household Use.

Class 17.00—Education and Information.
17.10 Printing and Publishing.
17.20 Education.

Class 18.00—Recreation and Amusement.

Class 19.00—Equipment and Supplies for Office Use.

Class 20.00—Machinery and Equipment for Industrial Use.
20.10 Metalworking machinery.
20.20 All other—including Mine, Construction, Special & General Industrial.

Class 21.00—New Buildings, Construction of.
21.10 Buildings for Manufacturing and Commercial Purposes, Construction of.
21.20 All Types of Dwellings, Construction of.
21.90 All other Types of Buildings, Construction of.

Class 22.00—Operating Supplies and Building Repair & Maintenance.

Class 23.00—All Other End Uses—(excludes all sub-assemblies and parts going into finished products coming with the other classes).

PURCHASERS' SYMBOLS

In addition to the information required in respect to Allocation Classification symbols, the War Production Board will still have need of the information which is already being furnished as to whether the orders are placed by the Army, the Navy, etc. This will be continued and slightly extended. A series of letter symbols has been adopted to indicate the purchaser.

Purchaser	Symbol
The Army	USA
The Navy—includes Maritime Commission	USN
Lend-Lease	LL
Other Foreign Purchasers	FP
Domestic Purchasers	DP

When Orders bearing these symbols are received by a business, the business must pass them on to its suppliers even though the Allocation number may be changed.

The appropriate purchaser's symbol should in each case precede the numerical allocation symbol placed on purchase orders so that the Allocation Classification will be broken down by Army, Navy, Lend-Lease, etc. The same instructions for transmission in percentages, etc., apply to these symbols as to the Allocation symbols.

(STEEL will publish further information and instructions in regard to use of the system as details are clarified by WPB. It was indicated late last week that amendments may be made before June 30).

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES . . .

Data on subcontract work are issued by local offices of the Contract Distribution Branch, WPB. Contact either the office issuing the data or your nearest district office. Data on prime contracts also are issued by Contract Distribution offices, which usually have drawings and specifications, but bids should be submitted directly to contracting officers as indicated.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Rm No. 762 and 763: A local source requires truck parts in quantities of 300,000. One item cast steel, the other malleable iron. Both require machine for drilling and disc grinding. Print at exhibit room.

Rm No. 764: Local source desires 40,000 housings, consisting of three parts, 5000 as soon as possible. Material not furnished. Machine tools required, turret lathes, drill press, grinder, milling machines. Source will consider production of individual items by separate contractors. Print on display.

Rm No. 720 to 761: Chicago firm desires screw machine capacity on 42 small parts, requiring automatic and hand screw machines, with threading capacity. Quantities run from 200 to 26,000, fair tolerances, some of which require other operations, such as milling, drilling, broaching and grinding. Print at exhibit room.

Rm No. 666 to 690: Local prime contractor requires screw machine capacity only on bearing races. Capacity required ⅞ to 4⅝-inch. Quantities range from 200 to 3000 pieces on screw machine tolerances. Material furnished. Prints at exhibit room.

Rm No. 504 to 526: Eastern prime contractor desires various kinds of machining on parts, consisting of forgings and aluminum. Forgings are furnished; aluminum is not. Quantities range from 250 to 5000 pieces. Prints on display at exhibit room.

Rm No. 779: Screw machine part, 10,000 to 20,000 required; ⅝-inch diameter, A.M.S. No. 5610 stainless steel; second operations are tapping, drilling and slotting.

Rm No. 780: Screw machine part 5/16-inch diameter, 21/32-inch long; A.M.S. No. 5610 stainless steel; second operation is cross drilling; 10,000 to 20,000 required.

Rm No. 781: Screw machine part ⅝-inch hex, 1 5/16-inch long; 10,000 to 20,000 required; A.M.S. No. 5610 stainless steel; internal and external threads, internal grinding and drilling.

Rm No. 782: Screw machine part, 9/16-inch diameter, ⅛-inch long; A.M.S. No. 5610 stainless steel; heat treated; centerless grinding and drilling; 10,000 to 20,000 required.

Rm No. 783: Screw machine part, ¼-inch diameter, 1⅝-inch stud; A.M.S. stainless steel; ¼-28 and ¼-20 threads, close limits; 40,000 to 50,000 required.

Rm No. 784 to 832: This group consists of screw machine parts from 3/32 to 1¼-inch diameter. All are A.M.S. No. 5610 stainless steel except a few which are 17ST Dural. All have second operations, consisting of threading, tapping, milling, drilling, burnishing or grinding. Quantities, 10,000 to 90,000, with material furnished. A-1-a priority.

Rm No. 916: Prime contractor wants source to silver solder bomb fuse liner seat. Parts are approximately 1⅝-inch diameter, 4 inches long. Part to be soldered on O.D. is approximately ⅝-inch long. Quantity 10,000 per day, if possible. Immediate delivery desired. Material furnished. Samples on display in exhibit room.

Rm No. 918-921: Four forged steel four-bladed propellers from 14⅝ to 16½ inches diameter. Subcontractor to furnish forgings and machine complete; 2000 each required on A-1-a priority. Turning, profiling and balancing required.

Rm No. 922: Bevel gear, 15/16-inch diameter, 29/64-inch long of 17 ST dural; 28 pitch; 8000 required on A-1-a priority; materials not furnished.

Rm No. 923: Spur and mitre gear, ⅛-inch diameter x 6/15-inch long, stainless steel; both gears are 48 pitch, plus or minus .001 on p.d.; 8000 required on A-1-a priority; delivery as soon as possible.

Rm No. 926: Pinion gear, .208-inch diameter, .125-inch long, made from 7/32-inch diameter .166; 8000 required on A-1-a priority.

Rm No. 933-950: Bronze spur gear, several steel worm gears and several bronze spiral gears in this group; 6000 each required, A-1-a priority; material not furnished.

Rm No. 949: Fuze body part, 1⅝-inch diameter x 2⅛-inch long; 1335 steel; 600,000 required at rate of 100,000 per month; A-1-b priority, material furnished. Job requires 1⅝-inch multiple spindle screw machine, six-spindle chuckers and drill presses.

Rm No. 950: 37-mm. shell body, 1.441-inch diameter by 3⅝-inch long, SAE 3155 or 3455 C. D. steel; 600,000 required at 100,000 per month; A-1-b priority, material furnished. Six-spindle 1⅛-inch automatic screw machines and heat treating facilities required.

Rm No. 951-957: Five steel forgings and two steel castings; 750 sets needed at rate of 300 per month; material furnished; turret lathes, drills, tappers, mills are required; external grinding, broaching and heat treating is also necessary in some cases; A-1-a priority.

Rm No. 958: Machining only on 50 irregularly shaped cast iron parts, 12⅛ x 9½ x 4⅛-inches. Vertical boring mill, jig borer or horizontal boring mill required. Castings are furnished; A-1-a priority; needed at once.

Rm No. 959: Steel screw machine part requiring multiple-spindle machine with 2⅝-inch capacity; 1000 to 5000 per day, soon as possible. Drilling, tapping and cadmium plating also required. A-1-a priority.

Rm No. 960: Steel screw machine part 3⅝-inch diameter; threading, tapping, milling and drilling required; 1000 to 5000 per day; A-1-a priority.

Rm No. 961: 2000 pieces, 5⅛-inch O.D. welded steel tubing, 25⅛-inches long, made of 5/32-inch steel (Navy specification 44-T-1 or 48-S-5) are required at once. Each tube must be chamfered at both ends and be stamped with piece mark. A-1-a priority.

Rm No. 962: Screw machine blanks, 1 11/16-inch O.D. x .582-inch—.586-inch I.D. x 17/32-inch long, made of X1314 steel furnished by prime contractor, is required at rate of 2000 per day, as soon as possible. Total quantity 60,000; A-1-f priority.

Rm No. 963: Screw machine blanks, 1 7/16-inch O.D. x .582-.586 I.D. x 33/64-inch long, made of X1314 steel; 60,000 required at 2000 per day, starting at once. Material furnished.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-134: New Jersey machine tool manufacturer is seeking subcontractors who can machine meehanite castings weighing approximately 900 pounds. Machines needed are either planer-type milling machine with circular table to swing 5 feet or horizontal boring mill with vertically mounted circular table.

S-135: New Jersey firm making ordnance items for the Army is seeking thread milling facilities for cutting 1⅛-inch triple acme thread, 3/16-inch pitch. Material is SAE 1040 hot-rolled steel, to be furnished by prime contractor. Blueprints available at Newark, N. J., office, 20 Washington Place.

S-136: New Jersey firm is seeking subcontractor having heat treating facilities for aluminum castings, to be furnished by prime contractor.

S-137: New Jersey contractor is seeking tool and diemakers who can manufadture the following: Special gages, tolerances of slots and location of pins plus or minus .00025 and up. Punches, location within plus or minus .0005 and up. Dies, location of holes plus or minus .0005 and up, size of holes plus or minus .00025. Fixtures, tolerances .001 and up. All work of highest quality, and completely finished with respect to corners, edges, etc. Shops must be in Northern New Jersey to permit prime contractor to visit and determine suitability.

D-23: A Providence, R. I., manufacturer is seeking ⅝-inch automatic screw machine facilities to turn out an ordnance part in quantities up to 1,000,000.

D-24: Detroit manufacturer of aircraft engines is seeking automatic screw

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DUST
Collector

An "Old English Sheep Dog" makes a good "portable dust collector" around the house, but for dust collecting in your factory, machine shop, etc., you need a TORIT DUST COLLECTOR! These efficient, self-contained units trap dust as it comes off grinding and buffing wheels. Yes—and they're portable too—easily moved wherever needed. TORIT Dust Collectors are "guardians" of employee health, "protectors" of vital machinery.

Write today for bulletin giving complete data, prices, and operating features.

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MANUFACTURING COMPANY
285 Walnut St. St. Paul, Minn.

TORIT Dust Collectors
SELF-CONTAINED UNITS

machine facilities for manufacture of 96 items of steel and bronze aircraft engine hardware in quantities of 14,000 to 200,000. Samples, specifications and drawings on display at New York office.

D-25: Long Island manufacturer of a variety of forgings is seeking complete tool and die shop facilities for production of a number of forging die blocks, varying in size from 2 x 6 x 4 inches to 8 x 10 x 12 inches. Facilities capable of turning out large quantities, 50 to several hundred weekly, are desired. Samples, specifications and drawings are available at the New York exhibit.

D-26: New York City manufacturer of steel fittings seeks subcontractors with 800 to 3000-pound drop hammer facilities for manufacture of three hooks and buckles in quantities of 50,000 to 60,000. Subcontractor must furnish forging dies. Hooks and buckles are of SAE 4130 steel and are in general about 3 x 3½ inches. Samples, specifications and drawings are available at New York office.

S-138: New Jersey firm seeks subcontractor with time available on a Blanchard surface grinder for grinding items of tool steel, four surfaces on each item. First item is 8¾ x 2½ x ⅝-inch, quantity 25,000 pieces, delivery rate 800 pieces per week. Second item is 4⅝ x 1⅛ x 1-inch, 18,000 pieces at 1200 pieces per week. Tolerances, minus .000, plus .005. Materials furnished by prime contractor. Blueprints available at Newark office, 20 Washington place.

Milwaukee office, Contract Distribution Branch of WPB, 161 West Wisconsin avenue, Milwaukee, Wis., is seeking contractors for the following:

WP285: Additional facilities wanted for immediate production of turnbuckles and turnbuckle parts for aircraft work.

WP292X: Prime seeks sub to machine WD 4140 forging end connection, raw material furnished by prime. Boring, milling and drilling required. Prime will complete hardening, broaching and inspection and will supply jigs, fixtures and tooling or lend engineering talent for design and construction of same.

WP293X: Sub needed to machine tank track shoes of grade 4 alloy cast steel or an SAE 3140 drop forging, prehardened by prime. Machining includes boring and/or broaching two holes 1.620-inch plus .010-inch tolerance, to a length of 12 inches. The piece is approximately 12 x 5⅛ x 3⅛ inches.

WP279X: Prime will furnish alloy steel forging on tube connection having appearance of a screw eye. Quantity is 3000, to be produced 500 per month.

WP280X: Prime will drill cross holes and cadmium plate, on striker of WDX1314 cold-drawn steel, A-1-a priority on part. Quantity is 1,000,000, to be produced at 40,000 to 50,000 per month, part or whole.

Cleveland office, Division of Contract Distribution, WPB, Union Commerce building, is seeking contractors for the following:

1-S-151: Subcontractor needed to blank and cut teeth on spiral, spur and worm gears of following dimensions: Two items spiral gears, 3.5-inch diameter and 2/185-inch diameter; two items spur gears 3.566-inch and 1.446-inch diameter; two items worm gears 2.25-inch long x .452-inch diameter and 3 9/32-inch long and .841-inch diameter. Equipment indicated: hand screw machines or lathes, hobbers to cut involute teeth, and standard B & S worm threads, heat treating and grinding equipment; material, bronze castings (comp 5); phosphorus bronze

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Offices In All Principal Cities

grade A steel WD1045CD and grade 7-D CD. Quantity, 6000 of each item. Delivery as soon as possible, completed by October. Blueprints on file at Cleveland office.

1-S-152: Subcontractor with press brake equipment to form side rail measuring 89 inches long, 21⅛ inches wide and ⅛-inch thick. Material cut to shape and ready for bending, furnished by prime contractor. Quantities 100 to 300 pieces per month. Tolerances close. Blueprints on file at Cleveland office.

1-S-154: Subcontractor with facilities to machine outside surface of sloping ¾-inch plate, to correct distortion caused by welding to subassembly. Equipment indicated: Sixty-inch planer or heavy-duty milling machine. Operations: Mill or plane surface. Material furnished by prime contractor, ¾-inch sheet steel welded to shell 4 feet 3 9/16-inches long x 3-inch diameter. Delivery; Four June 10, four July 1, four July 22. Tolerances, commercial. Blueprints on file at Cleveland office.

Minneapolis office, Contract Distribution Branch of WPB, 326 Midland Bank building, is seeking contractors for the following:

S.O. No. 197: Numerous automatic screw machine parts from 3/16 to 2⅛-inch, in quantities from 200 to 7200. Material furnished and early deliveries required.

S.O. No. 198: Quotations wanted on small drop forging in quantities of 1000 to 20,000. First delivery required early in June. Drawing available at this office.

STRUCTURAL SHAPES .

SHAPE CONTRACTS PLACED

7100 tons, additions, Lukens Steel Co., divided about equally between Belmont Iron Works, Philadelphia, and Welded Steel Shapes, Coatesville, Pa.

2000 tons, building, E. C. Atkins & Co., Indianapolis, to Central States Bridge & Structural Co., Indianapolis.

761 tons, Dresser power station, Public Service Co. of Indiana, Terre Haute, Ind., to Vincennes Steel Corp., Vincennes, Ind.

580 tons, cofferdam frame, navy yard, to Jones & Laughlin Steel Corp., Pittsburgh, through Dry Dock Constructors Inc., New York.

500 tons or more, 35-mile transmission line No. 3, Bonneville, Oreg., to Vancouver, Wash., Bonneville Power Administration; to unstated interest; W. L. Ridge, Electric City, Calif., contractor, at $212,380.

300 tons, heat treating building, Midvale Steel Co., Nicetown, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

300 tons, piling, for shipways, Inq. LR1208, Concrete Ship Construction Co., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, bridge, access road, Bayonne, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through New Jersey Asphalt & Paving Co., Jersey City, N. J.

Unstated, circuit towers and structures, Coulee dam project, to unstated fabricator by Bureau of Reclamation, Denver.

Unstated tonnage, bridge cranes, Idaho, to Harnischfeger Corp., Milwaukee, $208,000, Bureau of Yards and Docks, Navy department, spec. 10877.

Unstated, four bridge cranes and 14 wall cranes for Puget Sound navy yard, to Shepard-Niles Crane & Hoist

What does a **94%** reduction in unloading time mean in terms of national welfare?

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NEW HAVEN, CONN.

SHAPE AWARDS COMPARED

	Tons
Week ended June 6	11,691
Week ended May 30	5,000
Week ended May 23	4,982
This week, 1941	21,577
Weekly average, 1942	28,819
Weekly average, 1941	27,373
Weekly average, May, 1942	15,336
Total to date, 1941	696,512
Total to date, 1942	622,342

Includes awards of 100 tons or more.

Co., Montour Falls, N. Y., $167,281; also one bridge crane for Keyport naval station to same plant; six bridge cranes for Puget Sound navy yard to Harnischfeger Corp., Milwaukee, Wis., $136,050.

SHAPE CONTRACTS PENDING

5000 tons, elevated highway, K street, Washington; postponed indefinitely; bids were due June 9.

600 tons, mill building, Republic Steel Corp., Mineville, N. Y., to Austin Co., Cleveland, contractor.

105 tons, bridge 13, War Department building road network, Arlington, Va.; bids in.

REINFORCING BARS . .

REINFORCING STEEL AWARDS

500 tons, expansion, airplane engine plant, Studebaker Corp., to Joseph T. Ryerson & Son Inc., Chicago; Consolidated Construction Co., Chicago; contractor.

500 tons, three grade separations, U. S. route 12, Willow Run, Mich., 270 tons to Bethlehem Steel Co., Bethlehem, Pa., 230 tons to Truscon Steel Co., Youngstown, O.

450 tons, building, Haskelite Mfg. Co., Grand Rapids, Mich., to Truscon Steel Co., Youngstown, O.

260 tons, depot warehouse, for war department to Ceco Steel Products Corp., Chicago; James I. Barnes Construction Co., Culver, Ind., contractor; bids May 23.

252 tons, depot warehouse, for war department, to Ceco Steel Products Corp., Chicago; Enjay Construction Co., Chicago, contractor; bids June 1.

Unstated, 613-foot state bridge near Eugene, Oreg., to unstated Portland house.

REINFORCING STEEL PENDING

125,000 tons, export engineering project, for which contracts for half of tonnage have been closed; held up by temporary suspension of project.

27,000 tons, 17 reinforced concrete barges for government, to Concrete Ship Constructors, Los Angeles; bids opened.

2000 tons, Coram, Calif., for Bureau of Reclamation; bids to Denver, June 8.

2000 tons, estimated, eight large and four smaller reinforced concrete tanks, oil tank farm, Casco Bay, Portland, Me.; spec. 10895, Bureau of Yards & Docks, Navy Department.

1250 tons, Odair, Wash., for Bureau of Reclamation; bids to Denver, June 8.

750 tons, locks, Sault Ste. Marie, Mich.; bids June 15.

225 tons, bridges 16 and 17, War Department building road network, Arlington, Va.; bids in June 5.

215 tons, Picatinny arsenal access road, bridge, sections 3 and 4A, Spicertown, N. J.; bids June 15 to Spencer Miller, Jr., state highway commissioner, Trenton, N. J.; preference rating A-1-e.

Unstated, Celilo canal project, Columbia river; bids in to U. S. engineer, Portland, June 6.

CONCRETE BARS COMPARED

	Tons
Week ended June 6	1,962
Week ended May 30	850
Week ended May 23	5,950
This week, 1941	13,653
Weekly average, 1942	9,629
Weekly average, 1941	13,609
Weekly average, May, 1942	6,010
Total to date, 1941	266,919
Total to date, 1942	209,894

Includes awards of 100 tons or more.

RAILS, CARS . . .

CAR ORDERS PENDING

Navy, eighty 40-ton freight cars of 36-inch gage, bids June 23; comprises 68 flat cars, 10 box cars and two gondolas.

BUSES BOOKED

A.c.f. Motors Co., New York: Ten 41-passenger for Worcester Street Railway Co., Worcester, Mass.; nine 37-passenger and four 33-passenger, for Southeastern Greyhound Lines, Lexington, Ky.; six 31-passenger for Eastern Development Co., Bangor, Me.; five 28-passenger for Conestoga Transportation Co., Lancaster, Pa.; five 44-passenger for Indianapolis Railways Inc., Indianapolis, Ind.; two 29-passenger for Denver, Colorado Springs & Pueblo Motor Way Inc., Denver.

PLATES . . .

PLATE CONTRACTS PLACED

118 tons, Dresser power station, Public Service Co. of Indiana, Terre Haute, Ind., to Vincennes Steel Corp., Vincennes, Ind.

Unstated tonnage, elevated steel water tank, Cheltenham, Md., Bureau of Yards and Docks, Navy department, spec. 10852; to W. E. Caldwell Co. Louisville, Ky., at $29,290, awarded May 27.

PLATE CONTRACTS PENDING

Unstated, outlet pipes and penstocks, Alder and LaGrande dams, Nisqually power project; bids in to board of contracts and awards, Tacoma, June 3.

PIPE . . .

CAST PIPE PLACED

1400 tons, various sizes, Los Angeles, allocated as follows; 700 tons to

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Tilted at 135° (from horizontal) this circular weldment is being rotated at variable speed in a complete circle for down-hand welding. With push-button control in one hand and rod in the other, this welder has a "production-line" job—faster, safer, better welding on a C-F Positioner. You can speed up *your* work on one of these machines which handle any size or shape up to 14,000 pounds

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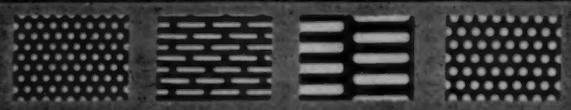

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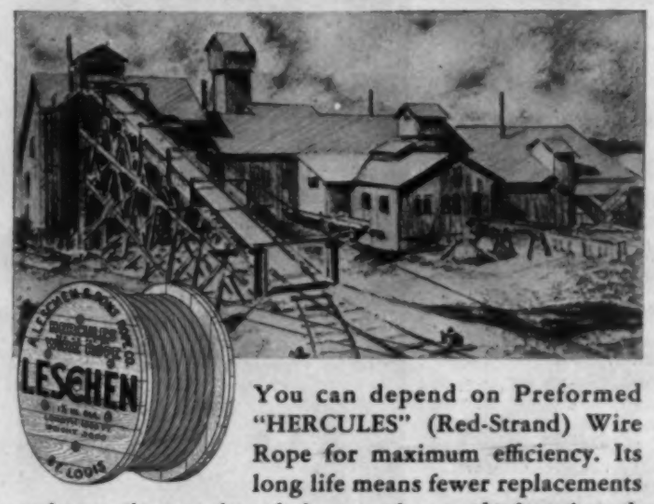

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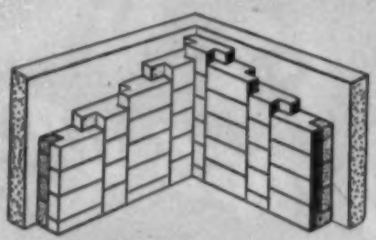

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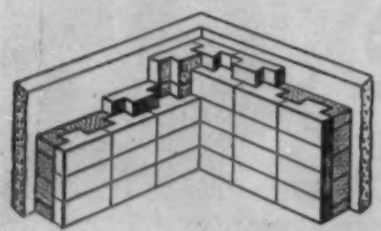
(PATENT APPLIED FOR)

Here is a new brick shape, manufactured of fire clay by the deairated method, and highly resistant to acid. It guarantees maximum strength of acid proof wall, and is particularly adapted for high temperature pickling tank construction. The bricks are so shaped that walls may be made 5" or 8" without using additional brick. The type shown above is especially adapted as a sheathing for steel rubber-lined tanks, concrete shell tanks, acid pits or wooden tanks. Samples and catalogs sent on request.



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(PATENT APPLIED FOR)

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STEUBENVILLE, OHIO

United States Pipe & Foundry Co., Burlington, N. J., 466 tons to American Cast Iron Pipe Co., Birmingham, Ala. and 234 tons to National Cast Iron Pipe Co., Birmingham, Ala.

190 tons, 6 and 8-inch, Hermiston, Oreg., to Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST PIPE PENDING

840 tons, 4 to 8-inch, King County water district No. 61, Seattle, Wash.; Valley Construction Co., Seattle, low on contract for cast iron pipe.

Unstated, $100,000 system improvement project, King County district No. 20; bids to H. A. Baumgart, secretary, 11860 Des Moines Way, Seattle, June 12.

CONSTRUCTION and ENTERPRISE

Ohio

ALLIANCE, O. — Strong Mfg. Co. will have to install considerable machinery, necessitated by receipt of war orders.

CLEVELAND—Colonial Iron Works Co., Lionel M. Stern, president, 17643 St. Clair avenue, is starting $12,000 addition to steel fabricating plant.

CLEVELAND—McGeorge and W. R. Hargett, 9400 Quincy avenue, Cleveland, are engineers for an industrial plant to cost $2,500,000.

CUYAHOGA FALLS, O.—Vaughn Machinery Co., Front and Broad streets, will erect 2160-square foot addition for welding shop.

ELYRIA, O.—Ridge Tool Co., Carl H. Ingower, president, stop 57, Cleveland road, North Ridgeville, O., will move to former Bender Body Co. plant on Clark street upon completion of $100,000 remodeling job. This development takes place of proposed new building.

KENT, O.—C. L. Gougler Machine Co., Charles L. Gougler, president and general manager, has acquired nine-acre site in Los Angeles for plastic mould plant.

HAMILTON, O. — General Machinery Corp. will erect $60,000 engineering building. Ferro Construction Co., Cincinnati, has contract.

SALEM, O.—Gonda Engineering Co., John H. Gonda, president, 631 West State street, will soon start construction of plant for war production.

WADSWORTH, O.—Ohio Injector Co. will erect $350,000 factory building containing 56,000 square feet of space.

Connecticut

BRIDGEPORT, CONN.—Bridgeport Tool & Die Corp., 57 Scofield avenue, has let contract for one-story 50 x 180-foot and 25 x 26-foot factory and boiler plant to E. & F. Construction Co., 94 Wells street. H. E. Koerner, 83 Fairfield avenue, architect.

BRIDGEPORT, CONN.—United Illuminating Co., 119 Broad street, has revised plans by Westcott & Mapes Inc., 139 Orange street, New Haven, for power plant superstructure. Estimated cost $1,000,000.

GUILFORD, CONN.—New Haven Clock Co., High street, will soon let contract for one-story 80 x 160-foot factory. I. Richmond, 248 Boylston street, Boston, architect.

HARTFORD, CONN. — Mylchreest & Reynolds, Hartford, are preparing plans for plant to be erected in Connecticut to cost approximately $1,000,000.

New Jersey

CAMDEN, N. J.—Warren Webster & Co. has awarded contract for general alterations to factory building to Austin Co., Philadelphia.

EAST ORANGE, N. J.—General Tool & Die Co., 555 Prospect street, has let contract for altering and building plant additions to George L. O'Brien, 476 North Arlington avenue.

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M-272

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Corp., 80 Broad street, New York, has awarded contract for one-story 60 x 140-foot steel manufacturing building here to National Derrick Co., Belleville Turnpike.

NEWARK, N. J.—Adams Stamping Co. will soon let contract for altering two-story factory. R. Kruger, 11 Hill street, architect..

Michigan

DETROIT—Gallagher Construction Co., Detroit, has general contract for $90,000 factory building on Ryan road for Aeronautical Products Co. Derrick & Gamber, Detroit, architects.

DETROIT—Terryott Machinery Co., 4555 Horatio, has been incorporated with $10,000 capital to deal in tools and dies, by Percy Oscar Ott, 15776 Woodingham drive.

DETROIT—Accessory Forgings Co., 1010 East Milwaukee avenue, has been incorporated to deal in tools, dies and gages.

DETROIT—Doall Detroit Co., 4226 Woodward avenue, has been incorporated to deal in tools, by P. J. Weber, 5240 Bernice avenue.

DETROIT—C. J. Glasgow Co. has been incorporated with $100,000 capital to deal in steel, iron, sheet metal; C. J. Glasgow, 2009 Fenkel avenue.

DETROIT—Albert Kahn Inc., New Center building, Detroit, is preparing plans for industrial plant addition in Ohio costing $2,000,000.

INKSTER, MICH.—Van Born Machine Products Inc., 28661 Van Born road, has been incorporated to deal in tools and dies, by Steve Hatulyn, 17736 Wood avenue.

MUSKEGON, MICH. — West Michigan Steel Foundry Co. will erect 60,000-square foot foundry building.

WYANDOTTE, MICH.—City has filed application for federal funds for expansion of waterworks. Estimated cost $260,000. Pate & Hirn, Detroit, engineers.

Pennsylvania

PHILADELPHIA—John J. Mattnews Co., Belgrade street and Lehigh avenue, has taken bids for two-story factory addition.

PHILADELPHIA—M. L. Bayard & Co., Twentieth street and Indiana avenue, plans machine shop costing over $40,000.

Illinois

CHICAGO—Engineering Systems Inc., 221 North LaSalle street, is engineer for industrial plant, location of which was not disclosed.

CHICAGO—Equipment Corp. of America, 1150 South Washtenaw avenue, has purchased from Allis-Chalmers Mfg. Co. a one-story plant at 1145 South Washtenaw avenue.

CICERO, ILL.—American Phenolic Corp., 1830 South Fifty-fourth street, has plans by Burham & Hammond, 160 North LaSalle street, Chicago, for one and two-story 80 x 310-foot factory.

EVANSTON, ILL.—Central States Engineers Inc., 1515 Sherman avenue, Evanston, engineer for industrial plant addition costing over $1,000,000.

LAGRANGE, ILL.—Electro Motive Corp. has awarded contract to Ragnar Benson Inc., 4744 West Rice street, Chicago, for plant to cost over $800,000 with equipment. (Noted May 18).

ROCKFORD, ILL.—Brearley Co., 2107 Kishwaukee street, plans addition to plant costing over $40,000 with equipment.

ROCKFORD, ILL.—Continental Electric Co. Inc., 2592 Ninth street, has awarded contract to Linden & Sons Inc., 1102 Tenth street, for factory costing approximately $100,000. W. Krieg, 180 Maplewood avenue, Riverside, architect.

Georgia

CHICKAMAUGA, GA.—City plans 500,000-gallon filter plant to serve city and environs. Tennessee Valley Engineering Corp., engineer, 212 Temple Court building, Chattanooga, Tenn.

Louisiana

NEW ORLEANS—Pan-American Alloys Inc., incorporated with C. C. Peters, McKeesport, Pa., as president, and W. S. Peters, Pittsburgh, as treasurer, will establish plant at 1115 South Liberty street here for manufacture of aluminum airplane parts. William Boustead, 947 South Cortez street, New Orleans, general manager.

West Virginia

SOUTH CHARLESTON, W. VA.—R. E. Shephard, 437 McCorkle avenue, South Charleston, is engineer for a power plant to be erected in Kanawha county by Carbide & Carbon Corp., 30 East Forty-second street, New York.

Missouri

KANSAS CITY, MO.—Pratt & Whitney division of United Aircraft Corp., East Hartford, Conn., will establish an air-

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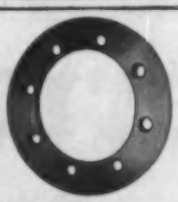

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ST. LOUIS—Air Reduction Sales Co., 630 South Second street, has let contract for one-story 56 x 90-foot addition to Murch-Jarvis Co., Cotton Belt building. Cost $40,000 with equipment.

ST. LOUIS—Liberty Machine Works, 2410 North Ninth street, has given contract for one-story machine shop addition to Bearveldt & Honig Construction Co., 611 Chouteau avenue. Cost $40,000 with equipment.

ST. LOUIS—City Pattern & Mold Co., Spring and Rutger streets, has let contract to Keithly Construction Co., 5029 Miami street, for addition to plant. (Noted May 25).

ST. LOUIS—Missouri Shipbuilding Corp. will erect and operate shipbuilding yard at foot of Marceau avenue. Estimated cost $3,000,000. (Noted May 4).

ST. LOUIS—Carter Carburetor Corp. has acquired site on Spring avenue north of St. Louis avenue for expansion.

Arkansas

BATESVILLE, ARK.—American Zinc & Lead Co., 818 Olive street, St. Louis, will operate manganese plant to be built near here.

Texas

HOUSTON, TEX. — Black-Broillier Inc., 803 Blodgett street, is expanding, remodeling and modernizing pipe manufacturing plant.

Iowa

CEDAR RAPIDS, IOWA—Collins Radio Co., 2920 First avenue Northeast, has awarded general contract to A. L. Jackson Co., 161 East Erie street, Chicago, for one-story 100 x 295-foot factory building. Graham, Anderson, Probst & White, 80 East Jackson boulevard, Chicago, architects. Project will cost over $100,000 with equipment.

KEOKUK, IOWA—Keokuk Electro Metals Co. has awarded contract to F. Vawter, 202 Old Colony building, Des Moines, Iowa, for power house to cost over $80,000. K. R. Brown, Valley Bank building, Des Moines, and Nemmers & Clark, Hubbell building, Des Moines, are engineers in charge of plans. (Noted April 6).

California

FONTANA, CALIF. — Plans are being prepared for $2,000,000 steam generating plant here for Kaiser Co. Inc.

HUNTINGTON PARK, CALIF.—Plans are being prepared for additions to office and factory buildings of Pacific Cut Washer Co., 2501 East Fifty-sixth street.

LOS ANGELES—Automatic Screw Machine Co., 800 East Gage avenue, has let contract for 104 x 280-foot factory to Lynch Construction Co., 730 East Gage avenue. Estimated cost $40,000. J. E. Mackel, 1126 North LaBrea avenue, engineer.

LOS ANGELES — Harvey Machine Co. has been incorporated with capital of $1,000,000, by L. M. and L. A. Harvey and L. C. Viereck. The new corporation is represented by Mr. Viereck, 112 West Ninth street, Los Angeles.

LOS ANGELES — Plans are being prepared for an addition to machine shop of Aircraft Tools Inc., 750 East Gage avenue, to cover an area 47 x 90 feet.

LOS ANGELES—Bethlehem Steel Co. is enlarging its Los Angeles plant at 3350 East Slauson avenue with additions to two buildings, construction of two buildings and extension of crane runway. Entire project will cost approximately $191,000.

REDDING, CALIF.—Pacific Gas & Electric Co., 245 Market street, San Francisco, has let contract for powerhouse building to H. H. Larsen Co., 64 South Park street, San Francisco.

Oregon

HERMISTON, OREG.—City clerk will take bids June 12 for filter-type sewage disposal plant, pump house, pumps, controls and other equipment. R. H. Corey, Portland, Oreg., engineer.

Canada

VANCOUVER, B. C.—Simplex Engine & Mfg. Co. Ltd., 1963 West Georgia street, has given general contract to J. J. Doyle & Sons, 196 West Twentieth street, for machine shop to cost about $50,000 with equipment.

VANCOUVER, B. C.—Canada Roof Products Ltd., 2627 Arbutus street, will build plant addition and install new equipment at cost of about $30,000.

COLLINGWOOD, ONT. — Collingwood Shipyards Ltd., Huron street, has given general contract to Fred A. Brock for one-story, 26 x 50-foot blacksmith shop to cost about $25,000 with equipment. Work also is to start soon on foundry and molding building to cost $58,000. J. S. Leitch is vice president.

HAMILTON, ONT.—Barber Die Casting Co. Ltd., 68 Sanford avenue North, has received bids through Prack & Prack, architects, Pigott building, and will let contract soon for one-story, 120 x 145-foot plant addition to cost $50,000.

LEASIDE, ONT.—Perfect Circle Co. Ltd., 205 Richmond street West, Toronto, has given general contract to Milne & Nicholls Ltd., 57 Bloor street West, Toronto, for plant addition here to cost about $100,000 with equipment. Marani & Morris, 46 Bloor street West, architects.

NEW TORONTO, ONT.—Wilson Motor Bodies Ltd., 48 Abel avenue, Toronto, has let general contract to Bradford Hoshal, 1170 Yonge street, Toronto, for two plant buildings here to cost about $80,000 with equipment. Plans prepared by Lindsay A. Wardell, 59 Kendal avenue, Toronto, architect.

NEW TORONTO, ONT.—Aluminum Co. of Canada Ltd., Sun Life building, Montreal, has given general contract to A. W. Robertson Ltd., 57 Bloor street West, Toronto, for foundry and office buildings here to cost about $500,000 with equipment. J. C. Meadowcroft, 1154 Beaver Hall Hill, Montreal, architect.

TORONTO, ONT.—Dominion Tar & Chemical Co. Ltd., Canada Cement building, Montreal, has let general contract to Redfern Construction Co. Ltd., 36 Toronto street, for buildings and addition to plant to cost about $112,000 with equipment.

ST. THOMAS, ONT.—Canada Vitrified Products Ltd., Talbot street East, J. A. Sutherland, secretary, is having plans prepared by John T. Findlay, architect, 19 Hincks street, who will call bids soon for plant addition to cost about $50,000 with equipment.

WALKERVILLE, ONT.—Dominion Twist Drill Ltd., 1858 Assumption street, has plans by J. C. Pennington, 209 Wyandotte street East, and will call bids for one-story plant addition to cost about $150,000 with equipment.

WINDSOR, ONT.—Colonial Tool Co. Ltd., 1857 Sandwich street East, in association with Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, is having plans prepared by J. P. Thomson, 1191 Windermere road, and will call bids soon for plant to manufacture cutting tools at cost of $135,000, in which equipment costing $350,000 will be installed.

L'ISLET, QUE.—LaFonderie L'Islet Ltee. has plans for plant addition to cost $25,000 with equipment.

MONTREAL, QUE.—Canadian Liquid Air Co. Ltd., 1111 Beaver Hall Hill, has called bids for plant addition to cost, with equipment, about $60,000.

SHERBROOKE, QUE.—Manganese Steel Castings Ltd., Abenakis street, has let general contract to Newton Construction Co. Ltd., 150 Victoria street, for foundry addition to cost $15,000, equipment extra.

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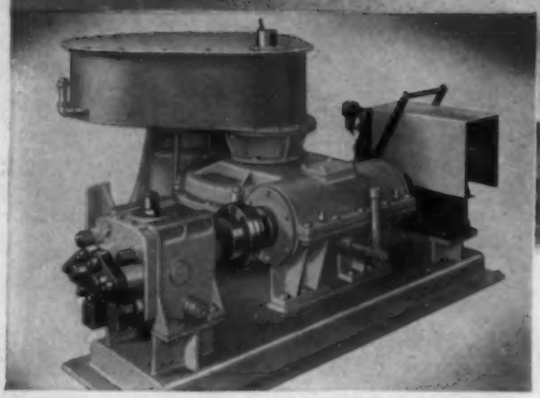

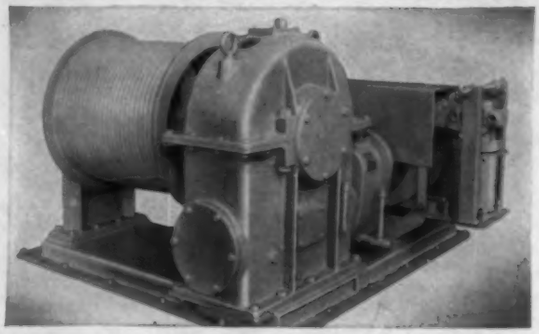

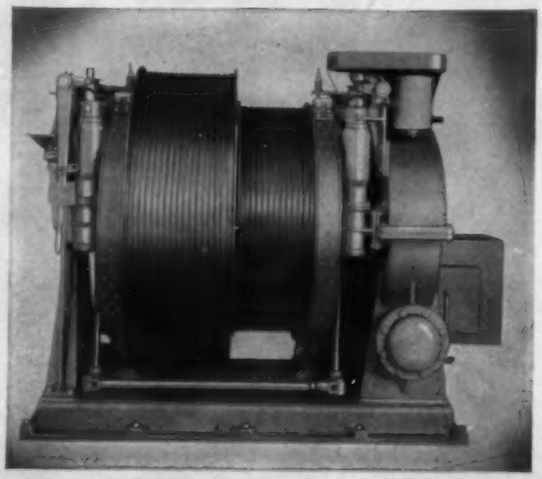

During its 30 years, Cleveland not only has become the largest producer of Worm Gearing, but has gained wide appreciation for its Engineering resourcefulness in making successful installations on unusual jobs throughout all major Industries.

From this continual, long-range development have come Standard Types in ample ranges of capacities and ratios which meet nearly all specifications; and Worm Gearing of special design for those which do not.

Through years of diversified experience doing a single job successfully, we are honored to serve the United States Navy through the contractors who supply Cleveland-operated Deck Machinery. The Units illustrated here are typical.

The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland, Ohio.

Affiliate: The Farval Corporation, Cleveland, Manufacturers of Centralized Systems of Lubrication.

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PEACOCK BROTHERS LIMITED

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Continuous Strip Coiling Equipment.
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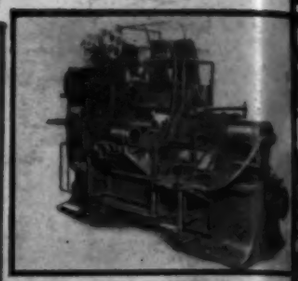
Strip Coil Holders.
Strip Coiling Reels.
Sheet Galvanizing Equipment.
Automatic Tinning Equipment.
Automatic Doublers.
Normalizing Furnaces.
McKay Levellers and Processing Units.
Strip Welding Equipment.
Continuous Strip Pickling Equipment including: Uncoilers, Up-Cut Shears, Stitching Machines, Pinch Roll Units, Recoilers, Drying Machines, Pickling Tanks, and Auxiliary Equipment.
Scrubbing, Leveling and Oiling Machines for Flat Products.
Wilson Vertical Tube Type Annealing Furnaces.
Corrugated Inner Covers.
Automatic Feeding and Catching Tables.
Continuous Pack and Pair Heating Furnaces.
Wheelabrator Abrasive Cleaning Equipment.
Automatic Weight Classifier.
Automatic Gauge Classifier.
Shell Lathes.
Airplane Motor Sleeve Lathes.
Armor Plate Levellers.
Vacuum Cup Lifters.

For WAR Purposes



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•

The Hallden Machine Co.
THOMASTON, CONN.

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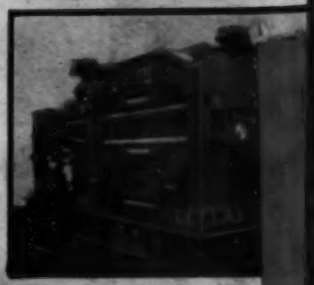

The WEAN ENGINEERING CO., INC.
WARREN, OHIO
SUBSIDIARY COMPANY
THE BRODEN CONSTRUCTION CO., CLEVELAND, O.
Mfgrs. of Strip and Wire Mill Machinery